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A TIME OF RENEWAL
W e have reached a critical era of renewal and rejuvenation here at the Faculty of Dentistry. In November 2014 we published our Faculty’s Strategic Plan 2014-19, in which we outlined key initiatives aimed at strengthening our educational programs and research foci, improving the student experience at the school, broadening our public relations reach, and achieving our mission in new and unprecedented ways. This past June we deliberated on our progress to date. The various implementation working group chairs and committee members compiled reports on each of the 21 priority action items tasked for Year 1. The results have been published in our Year 1 Progress Report, which can be accessed here: bit.ly/YearOneGala.

One of the main areas of development we are collectively working on through the Strategic Plan is the improvement of student experience. We have addressed this challenge on numerous fronts: from the hiring of Dr. Rick Rayman as Director of Student Life, to the expansion of our student outreach placements, to the completion of a comprehensive DDS curriculum review.

As a Faculty we are continually renewing our commitment to modelling and passing down the highest standards of ethics possible to our dentists-in-training, and our Strategic Plan has been bearing out this priority. In a carry-over from our first year’s priorities, a working group led by Dr. Howard Tenenbaum will look at ways in which we can further ingrain professionalism throughout our Faculty, and in the process, set even higher standards for our students to exemplify. Our students continually demonstrate that this is a priority they proactively pursue on their own. For instance, DDS student Alina Karpova, with the faculty guidance of Dr. Rayman, is leading a Student Professionalism and Ethics Association (SPEA) chapter at the Faculty. SPEA was an idea originally seeded with our students by alumnus Dr. Rollin Matsui 7T9 DDS, who, while visiting our school as a representative of the American College of Dentists, urged our students to embrace an active examination of professionalism and ethics. Sadly, Dr. Matsui passed away this past November, yet I know he would be very proud of this legacy he leaves behind, as one of his many contributions to our profession.

As part of our Strategic Plan consultations, we also received from our faculty and staff a mandate to move ahead with a plan to refresh the Faculty’s organizational structure. With this new, more streamlined Faculty structure, we can create greater opportunities for collaborations and cross-disciplinary learning across the specialties, as well as between basic science and clinical research and education – vital components to our future success as an institution. With this new, more collaborative model we can more quickly and effectively translate our research strengths into identifying and solving clinical problems – with a direct and positive impact on the future of dentistry.

Each of these interdependent goals has been crafted in response to the vast changes our profession faces and as we look to where dentistry needs to shift in the future. More than just semantic exercises, our strategic priorities are aimed at taking us to the next level as a Faculty. As a leading institution of teaching and research in our field, it is our responsibility to proactively evolve and respond to these challenges, and we need to do so deliberately, with thoughtfulness and precision.
Six projects involving investigators from the Faculty of Dentistry, worth just under $2.8 million, have been funded by the Canadian Institutes of Health Research. The topics to be studied range from bone loss and bone growth to salivary biomarkers, middle ear infection, tissue engineering and collagen mineralization at the periodontal ligament-cementum junction.

Professor Amir Azarpazhooh OT7 MSc DPH, OT1 PhD and research partners at St. Michael’s Hospital will investigate the safety of xylitol, a naturally occurring sugar found in birch, and widely used in products from chewing gum to toothpaste. With its antibacterial properties, xylitol may reduce levels of Streptococcus pneumoniae and Haemophilus influenzae, the two bacteria most commonly associated with middle ear infection in children under 12.

Professors Dilani Senadheera OT7 PhD and David Lam OT1, OT8 PhD, with co-researchers from Western University and the University of Waterloo, plan to investigate the role of oral microbial and salivary biomarkers in predicting infection after radiotherapy.

“Staying competitive with funded research is one of the Faculty’s key strategic priorities,” says Dean Daniel Haas OT9, OT8 BScD, OT8 PhD. “These most recent grant competition results demonstrate to me that our research is collaborative, cross-disciplinary, and translatable – qualities necessary for success in Canada’s decreasing research grant market.”

“I am particularly thrilled and impressed with the success of our junior faculty members,” says Professor Ben Ganss, Associate Dean, Research. “This may just be the beginning of a sustained wave of new discoveries with all our disciplines working together toward tangible health benefits.”

The survival rate of oral cancer – approximately 50 to 60 per cent over five years – has remained stagnant for decades while other cancer survival rates have dramatically improved. That could change now that Dentistry collaborators have unearthed a significant connection between the inflammatory response of neutrophils, immune cells common in saliva and the oral cavity, and the spread of this deadly disease.

“There’s a unique inflammatory response with oral cancers,” says Assistant Professor Mano Magalhaes OT7 PhD, OT7 MSc OP/OM. Like other immune cells, neutrophils secrete a group of molecules, including tumor necrosis factor alpha, that regulates how the body responds to inflammation. The study noted that oral cancer cells secreted interleukin-8, another inflammatory mediator, which activates neutrophils, effectively establishing a massive immune-response build up or “feedback loop.”

Ultimately, the researchers found, the immune-response loop resulted in increased invasive structures known as “invadapodia,” used by the cancer cells to invade and metastasize.

“If we understand how the immune system interacts with the cancer we can modulate the immune response to acquire an anti-cancer response instead of a pro-tumour response,” Magalhaes says. While the research points to the possibility of one day creating targeted, personalized immunotherapies for patients with oral cancer that could effectively shut down the abnormal immune response, the team is currently expanding upon their study of inflammation and oral cancer. The study was published in the journal Cancer Immunology Research.

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GROWING BONE BETTER AND FIGHTING S. MUTANS

Two award-winning student projects could help clinicians create more controlled bone growth, or reduce the virulence of Streptococcus mutans by as much as 60 per cent. Gazelle Crasto ITA MSc, IT6 PhD and Gursonika Binepal IT6 PhD took second and third place, respectively, in the basic science category of the recent Canadian Association of Dental Research Student Research Awards.

Bone morphogenetic protein (BMP) can regenerate bone in the oral cavity, but comes with hazardous side-effects that include cancer. Crasto developed a liposome “fat bubble” delivery system that sharply reduces the amount of BMP needed. In preclinical trials, she also demonstrated that by “detonating” BMP-containing bubbles with ultrasound, dosages can be released at intervals, giving researchers control over the timing of the healing.

Binepal’s research showed a link between potassium uptake by Strep. mutans and its virulence. “We could place blockers in a mouthwash or toothpaste,” she says, “which could prevent free potassium from entering the cell and thus make the bacteria’s ability to flourish in the oral cavity. Binepal also showed that by detaching” BMP-containing bubbles with ultrasound, researchers could control dosages released at intervals, giving researchers control over the timing of healing.

Crasto will also represent Canada at the International Association of Dental Research’s Hatton Competition next June in Seoul.

MOLECULE COULD PREVENT HEART VALVE DISEASE

More than a million Canadians living with heart valve disease—a condition that is not treatable medically—may soon have new hope, thanks to research led by Canada Research Chair and Professor Craig Simmons. In October, Simmons was awarded the 2015 OP Has Heart Cardiovascular Award from the Heart and Stroke Foundation and Canadian Pacific, valued at $280,867, which he will use to investigate whether a molecule known as CNP can help slow the progression of calcific aortic valve disease, with a long-term goal to improve patients’ quality of life. “Our work has shown that the CNP molecule is important to maintain healthy heart valves,” says Simmons, who is cross-appointed with the Institute of Biomaterials & Biomedical Engineering and the Faculty of Dentistry. “This award will support collaborative efforts with researchers in engineering and medicine to test CNP as a treatment for valve disease.” In 2015, Simmons was appointed scientific director of the Translational Biology & Engineering Program, a new multidisciplinary research initiative within the recently established Ted Rogers Centre for Heart Research.

MESSAGE UNDELIVERABLE?
Don’t miss out! Keep up with the latest alumni news and events by ensuring that we have your current address on file. Please update your address with Sabrina martinez@dentistry.utoronto.ca

UNUSED EQUIPMENT? IT CAN MAKE A DIFFERENCE IN ETHIOPIA

ofT Dentistry is helping Addis Ababa University in Ethiopia establish its first dental school. A partner in the Toronto-Addis Ababa Academic Collaboration, the Faculty sent instructors to facilitate academic programming for the new school in December 2015, and will be continuing month-long teaching rotations in 2016. The Addis Ababa dental school’s new five-year DDM program will help the African nation overcome a desperate shortage of dental professionals in the country, in which an estimated 90 million people are being served by 200 dentists and only 21 specialists.

While the school has received donated chairs, more help is needed. Here’s where you can help: UofT Dentistry is collecting for the school equipment and supplies that would be useful in a contemporary office, including:

- Equipment compatible with 240-volt electricity
- Autodrillable dental instruments
- Materials sealed in manufacturer’s original packaging and at least one year from expiry (no liquids)
- Textbooks and journals published in the last five years
- Metal cabinets and office equipment. (Woods cannot be accepted)

Inquiries can be directed to: Aaron Fenton, Professor Emeritus Email: a.fenton@dentistry.utoronto.ca Phone: (416) 979-4910 4446

TRAIN THE FUTURE OF DENTISTRY

Interested in teaching in the Faculty’s Clinics? If you have an interest in clinical or pre-clinical teaching at the Faculty of Dentistry, University of Toronto, we’d love to hear from you. For more information, please email Human Resources at: humanresources@dentistry.utoronto.ca or call Dorcas Johnson at: (416) 979-4900 x4316.

MENTORING YOUNG ALUMNI

More young alumni are enjoying the benefits of belonging to the Faculty of Dentistry Alumni Association, thanks in part to Dr. Amit Puri OT0 DDS, who was president of the Association from 2010 to 2015. Puri’s efforts to mentor recent graduates and reach out to volunteers have made him a stellar Faculty ambassador to young dentists—and haven’t gone unnoticed. Puri recently received an Arbor Award from the University in gratitude for his outstanding volunteer service. All alumni are members!

Connect with your Alumni Association at: www.dentistry.utoronto.ca/alumni

REFERRALS WELCOME

In order to provide our third- and fourth-year DDS students with an enriched clinical experience, the Faculty clinic is now accepting “procedure-specific” endodontic and prosthodontic referrals from private practice. Do you have a patient you think would be a good fit? Simply download a referral form from the website address (dentistry. utoronto.ca/patient-clinics/patient-referrals), fill it in, and fax it back to the Clinic Office (any associated radiographs are best given to the patient).

Upon completion of the specified procedure, the patient will be referred back to your care. Thank you for your contributions to dental education.
Dentistry scientists are changing the way we think about and treat an age-old problem.

The FOREFRONT of
PAIN RESEARCH

Dentistry scientists are changing the way we think about and treat an age-old problem

BY MARK WITTEN  ILLUSTRATION BY LINO
PAIN IN YOUR MIND
Assistant Professor Iacopo Cioffi wanted to know whether a new type of orthodontic archwire could reduce the initial pain experienced by most patients with braces. But his clinical trial (which ended up finding a significant benefit for thermoelastic over conventional wires) had an unexpected finding. Psychological stress was among the variables considered in the study, says Cioffi. That data set suggested a correlation between the intensity of the pain that patients reported and their scores for anxiety traits, no matter which type of hardware was being used.

This accidental finding, tapping into the well-known link between anxiety and pain, was the catalyst for studies Cioffi has since conducted to directly assess how psychological traits affect patients’ pain perception following orthodontic procedures. In an upcoming publication, he compares the pain experienced by patients with braces to those of patients who generally feel secure and calm, after dental procedures. In an upcoming publication, he compares the pain treatment groups – for example, choosing a less complex procedure, to minimize pain risks and make compliance easier. “You need to tailor treatment to psychological traits to do the best for your patient,” says Cioffi.

PAIN IN YOUR BRAIN
From the psyche, it’s only a short step to the neuronal circuitry that encodes subjective experience. Enter Assistant Professor Limor Avivi-Arber, whose research reveals that dental procedures change the brain. Her studies show that tooth pain or changes to the bite resulting from extractions can reconfigure the neuronal circuitry of the brain regions devoted to processing the sensorimotor functions of the orofacial tissues. “Such neuromodulatory changes are key brain mechanisms that determine how patients adapt to dental treatments – or why, in some cases, they may not adapt and may remain with chronic pain or difficulties in chewing and speaking,” says Avivi-Arber.

In a 2015 study, Avivi-Arber and colleagues showed how treatment with dental implants can reverse the changes induced by tooth extraction. “By better understanding the brain’s neuromodulatory mechanisms underlying patients’ adaptations to dental procedures, we will be able to develop even better oral rehabilitative strategies,” she says.

PAIN IN YOUR GENES
But what makes some people better neurological adaptors than others? Individual differences point to genetics – and genetics is proving a fruitful field of study for U of T pain researchers. Professor Ze‘ev Seltzer is one of them. In 2002, he came to the Faculty of Dentistry from the Hebrew University in Jerusalem armed with DNA samples from 250 Israeli veterans who had lost a limb in combat and 650 Israeli women who had had breast surgery to remove a malignant growth.

Analyzing the samples, Seltzer and his colleagues found variants of three candidate genes strongly linked to higher levels of phantom limb pain in leg amputees and post-surgical pain in mastectomy patients. These genes, called P2RX7, KCNS1 and CACNG2, encode proteins involved in synaptic ion channels, meaning they regulate how substances such as sodium, potassium and calcium pass into and out of nerve cells during synaptic transmission in the central nervous system. “These ion-channel genes contribute to the excitability of pain pathways. The more excited neurons are, the more pain will be produced in higher brain pain networks,” explains Seltzer.

His larger goal is to help map all the genes involved in heritable susceptibility to developing chronic pain conditions after a nerve injury, understand the mechanisms by which they contribute to increasing or reducing pain, and eventually personalize pain medicine by applying this knowledge to...
guide diagnosis, prevention and treatment. Through collaborations with pain researchers in Canada and internationally, he now has access to DNA samples from more than 10,000 people with chronic pain conditions, along with matching control samples from people who underwent the same procedure but never developed chronic pain. “These numbers give us the statistical power to use a genome-wide approach to identify many new variants, which could allow us to discover novel pain mechanisms and targets for drug treatment,” he says.

A good example of the potential payoff from Seltzer’s research is in preventing post-surgical pain, since about 60 per cent of patients undergoing surgery report moderate to severe pain long after their wounds have healed. “Identifying the risk factors could help anesthesiologists and surgeons determine how best to treat patients with analgesic drugs before surgery to prevent chronic pain and even which surgical choices a patient should consider given their inborn risk,” says Seltzer.

**PAIN IN YOUR PROTEINS**

Another area where genetic research may help is in drug discovery, particularly for cancer. More than half of all cancer patients experience significant pain, and, as dentists are aware, head and neck cancers are the most painful. Assistant Professor David Lam, who is also Head of Oral and Maxillofacial Surgery, investigated a gene, TMPRSS2, which was associated with more aggressive forms of prostate cancer. He found that the gene was expressed in much greater quantities in patients with head and neck cancers than in those with prostate cancer. Lam discovered that when the protein expressed by TMPRSS2, found on the surface of cancer cells, comes into contact with nerve pain receptors, pain is triggered. The more the protein interacts with pain receptors, the greater the pain. He and his colleagues looked at cell lines of cancers ranging from lowest to highest in pain severity – head and neck, prostate, melanoma – and saw that the levels of the protein corresponded to the level of pain each cancer causes.

Lam’s discovery opens up new possibilities for innovative therapies that target TMPRSS2. “We’re working with pharmaceutical companies to identify target inhibitors of the gene, which could potentially provide a new treatment for cancer pain,” he says.

**PAIN IN YOUR NERVES**

While gene therapies may be the pain treatment of the future, we still have options in the here and how. Lam is also an oral-maxillofacial surgeon who uses innovative nerve repair techniques to relieve chronic pain that can result from a traumatic facial injury such as a tumour, broken jaw or serious tooth extraction. Lam vividly recalls a patient referred to him at the Wasser Pain Management Centre, who had developed numbness in her lower lip and chin after three implants were placed in her lower left jaw, and then severe chronic pain after the implants were taken out and replaced with three new ones. “She had electric shock-like pain that brought her to her knees in tears. The pain was aggravated when she wanted to kiss her grandchildren because putting her lips together caused the same pain,” he says.

Lam performed a nerve graft in which he removed the damaged portion of the inferior alveolar nerve and replaced it with a five-centimetre portion of nerve provided by a donor. He used a processed allogenic graft to provide support for the growing axons without generating an immune response. The results exceeded both his and the patient’s expectations. “She has 90 per cent of her sensation back and is completely pain-free,” says Lam.

Lam has performed 16 facial nerve grafts and is teaching the technique to other surgeons. His dual role in helping people fight pain is satisfying in different ways. “As a surgeon, the difference you can make in an individual patient’s life is a game-changer for that person. As a scientist, the impact of the research is you can help populations,” says Lam.

Identifying the risk factors could help anaesthesiologists and surgeons determine how best to treat patients with analgesic drugs before surgery to prevent chronic pain and even which surgical choices a patient should consider given their inborn risk.
THE PIONEER

In a career spanning nearly five decades, Dr. Barry Sessle has charted the frontier of orofacial pain research – a field that simply didn’t exist when he graduated from dental school in 1963.

BY: MARK WITTEN  PHOTO: JEFF COMBER

Dr. Sessle has led teams to map in great detail – and explain – the brain mechanisms that underlie the transmission of pain signals from the face, mouth and jaw, in combination with the neurochemical and non-neural processes that modulate the transmission of those pain signals. Sessle’s many contributions to craniofacial pain research, covering a full range of orofacial sensory and motor functions, have been achieved through wide-ranging collaborations with researchers internationally and in Canada, in combination with the creativity and dedication of his many colleagues, students and post-doctoral fellows at UofT Dentistry.

Dean of the Faculty of Dentistry from 1990 to 2001, Sessle played a key role in the establishment of the internationally renowned University of Toronto Centre for the Study of Pain. He is the recipient of numerous awards and honorary degrees, and his research has been continuously supported for the past 40 years by both the Canadian Institutes of Health Research and the U.S. National Institutes of Health. While Sessle has helped secure UofT Dentistry’s reputation for research excellence, his greatest impact has been the acceleration of vital health research. Sessle’s research milestones have expanded our understanding and knowledge in the pain field and helped innumerable patients who suffer from motor dysfunctions and chronic pain – which has estimated economic costs of about $30 billion annually in Canada and $300 billion in the United States.
Making Connections
Barry Sessle’s Groundbreaking Discoveries

As an Australian PhD student in the 1960s, Sessle collaborated with Dr. Ian Darian-Smith on studies of orofacial sensory and touch mechanisms and pathways in the trigeminal system (supplying nerves to the face and mouth.).

Most chronic pain states are more prevalent in women than in men, and Sessle showed that these sex-related differences have a physiological basis. His studies in collaboration with Dr. Brian Cairns (Vancouver) and with Dr. Peter Svensson, Dr. Lars Arendt-Nielsen and colleagues (Denmark) found, with certain types of stimuli, that females feel more sensitivity and have greater activity in pain fibres. They are also less sensitive to chemical mediators in orofacial tissues that dampen the activity of the pain fibres.

Collaborators Sessle, Dr. Ron Dubner (National Institutes of Health) and Dr. Art Storey (UofT Dentistry), discovered the neuronal processes and neurochemical modulators involved in pain transmission, both enhancing pain and depressing it. The team went on to publish an influential and highly successful book, The Neural Basis of Oral and Facial Function (1978) – the first-ever book on this topic – which is still used today.

Sessle’s research provided new insights into the neuroplasticity of pain processing in the brain and how this can lead to chronic pain. He has made key discoveries about the hyperexcitability of neurons in the brain in chronic pain conditions. The change in neurons after a peripheral nerve injury or inflammation reflects their hyperexcitability, which is a part of the central sensitization process that contributes to the development of chronic pain.

Central sensitization involves neuroplastic changes in the central nervous system that lead to increased pain sensitivity. Sessle and colleagues were the first to document central sensitization in trigeminal pain-sensing neurons in the brain by using a dental inflammatory model that they developed. The studies also demonstrated how central sensitization is a fundamental process critical in the development and management of chronic orofacial pain conditions.

Sessle’s recent studies with UofT Dentistry colleagues such as Assistant Professor Limor Avivi-Arber (Dip Prostho, M.D., PhD) are providing new knowledge about the role of the sensorimotor cortex and sensory and motor functions in providing people with a new dental prostheses or rehabilitative procedures – findings that promise to help improve rehabilitation strategies used to restore sensory and motor function in the mouth, and prevent or treat pain or motor dysfunctions resulting from maladaptive responses to oral changes.

Photo: istock.com

Mixed drugs developed to relieve acute or chronic pain have targeted neuronal processes underlying pain. Sessle’s research raises the possibility of developing new pain control drugs through his discovery that non-neural (glial) cells play a critical role in pain processing and chronic pain conditions. Sessle’s studies in collaboration with Dr. Koichi Iwata (Japan) and colleagues (Lapon) have shown the crucial involvement of glial cells in inflammatory pain and trigeminal neuropathic pain resulting from orofacial damage of nerves supplying the face and mouth.

Sessle’s collaborations with Dr. Art Storey and Dr. Jimmy Hu (both UofT Dentistry), Dr. Jim Lund (Montreal) and Dr. Koichi Iwata (Lapon) added to discoveries on brainstem mechanisms and circuits involved in pain and sensorimotor functions in the face, mouth and jaw. His brainstem research helped to explain how orofacial pain arises and is transmitted in the brain, and also how analgesic techniques such as acupuncture and narcotic analgesic drugs such as morphine act. This pre-clinical information has contributed to the development of new approaches to treat acute or chronic pain, such as deep brain stimulation, and new analgesic drugs.

Sessle’s long-time focus on orofacial sensory and motor functions in the cerebral cortex – involving collaborations with researchers from UofT, Japan, Montreal, Australia, Denmark and the U.S. – provided new knowledge and insights about the effects of orofacial pain on jaw muscle activity and movement, and on the role of the cortex in the learning and control of orofacial movements.

Most drugs developed to relieve acute or chronic pain have targeted neuronal processes underlying pain. Sessle’s research raises the possibility of developing new pain control drugs through his discovery that non-neural (glial) cells play a critical role in pain processing and chronic pain conditions. Sessle’s studies in collaboration with Dr. Koichi Iwata (Japan) and colleagues (Lapon) have shown the crucial involvement of glial cells in inflammatory pain and trigeminal neuropathic pain resulting from orofacial damage of nerves supplying the face and mouth.
Could a mysterious sexually dimorphic mechanism be key to personalized pain treatments?

BY: ERIN VOLLICK

Scientists are well aware that men and women have different experiences of pain. Now a new study by Faculty of Dentistry researcher Professor Michael Salter may have uncovered a reason why – sex hormone-mediated differences in the immune system. It’s a discovery that could have important consequences both for pain research and pain treatment.

“It is [well] known that the pain phenomenon is different in males and females,” says Dr. Pavel Cherkas, an assistant professor in Oral Physiology and Endodontics at the Faculty of Dentistry and a member of the University of Toronto Centre for the Study of Pain (UTCSP). For Cherkas, it’s a discovery that could have important consequences both for pain research and pain treatment.

New Chief of Research at the Hospital for Sick Children and former Director of UTCSP, along with McGill University’s Professor Jeffrey Mogil, has uncovered a male-female difference in the development of nerve pain, a difference related to the role of immune cells. The study found that two separate mechanisms drive neuropathic pain – one in males, and a different one in females. It’s a finding significant for the advancement of pain research, but one that could change the way that drugs are tested.

Through their investigations into neuropathic pain sensitivity (mechanical allodynia) stemming from peripheral nerve injuries, the duo concluded that after nerve trauma, males and females will experience the same degree of hypersensitivity. The condition caused when neurons in the spinal cord become hyperexcited.

Because hypersensitivity is caused by nerve damage, sexual differences weren’t thought to play a part in the mechanisms underlying this condition – a hypothesis borne out by their initial research findings: males and females seem to experience the same degree of neuropathic pain.

If you were to test male and female research models behaviorally you wouldn’t know there is a mechanistic difference `[causing the same degree of hypersensitivity]` says Salter, who is appointed to the Department of Physiology in the Faculty of Medicine and cross-appointed to the Institute of Medical Sciences and the Faculty of Dentistry.

But as they dug a little deeper, Salter and Mogil observed that microglial cells, immune cells of the spinal cord and brain that carry a specific pain receptor, toll-like receptor 4 (TLR4), thought to play a key role in causing mechanical allodynia, were the root mechanism causing hypersensitivity – but only in males.

“It’s one of those things that are almost black and white,” Salter says. “The microglial mechanism is on in males and off in females. We can even flip the mechanism back and forth with testosterone.” And although it is not known yet exactly what mechanism underlies female hypersensitivity, the researchers think it might derive from another immune cell, such as T lymphocytes.

Published in Nature Neuroscience this past August, Salter’s findings have taken many pain researchers by surprise. He explains, “In almost all neurobiology, in all pain research, we’d always used male [physiology] for research. This is almost universally the way it is in the pain world. Does that then mean one of the reasons drugs might fail when they get out to clinical testing is because the mechanisms are sexually dimorphic?" After all, if hypersensitivity is triggered through two separate mechanisms, then pain research and treatment models may need to be recalibrated – perhaps specifically personalized along sex lines.
THE MYSTERIES OF PAIN

UofT Dentistry’s mural makes a provocative statement on a universal experience

BY: ERIN VOLLICK

After nearly 40 years as a centrepiece of conversation, sometimes of heated debate, and the admiration of busloads of art tourists, the wall-length mural gracing the lobby of 124 Edward Street now requires its own restorative work: as an artwork occupying public space, the mural has experienced its fair share of wear and tear. The Faculty of Dentistry is currently raising funds to protect the legacy of this masterpiece created by world-renowned muralist Carmen Cereceda. Along with repairing the chips and cracks, funds will support installation of a protective barrier and interpretive signage.

At once a statement on the universal experience of pain, its origin as well as its cessation, the lobby mural has become priceless – not only to the Dentistry community for its remarkable commentary on the role of dentistry in relieving pain, but to the wider art world. What follows are just a few reasons why.

To donate to the Dentistry Mural Restoration Project, please contact Miriam Stephan, Advancement Coordinator, at: (416) 979-4775 or miriam.stephan@dentistry.utoronto.ca

FACTS

- Artist Carmen Cereceda invokes her native Chile through indigenous imagery of the womb and shamanism. Cereceda fled dictator Augusto Pinochet’s reign of terror in the 1970s, and after arriving in Canada as a young refugee, began teaching at the Ontario College of Art, where she was commissioned for the piece.
- The mural was commissioned by colleagues at UofT Dentistry to commemorate the life of Alan Black 6T2, who passed away at a tragically young age.
- Now in her 80s, Cereceda has become famous for her murals, which she is still producing around the world.
- Lost for decades, the original sketches of the mural have been recently unearthed and may one day be displayed alongside the mural.
- Cereceda’s work invokes the bright colours and brush strokes characteristic of her teacher, internationally renowned painter and muralist Diego Rivera, and the Magical Realism school of Latin American art.
- Cellular organisms grace the top corner of the mural, depicting our most primitive origins and our interdependence with all living organisms.
- An Amazonian “Mother Nature” is attached to her child by an umbilical cord, signalling the integral connection between birth, life and pain.

Penetrating mysteries of pain since first we emerged from darkness. They restore us to that balance born within the world’s boundless womb. The words were written by OCAD student Darlene Madott.

**THE GREAT ANAESTHESIA DIVIDE**

Geography can be a barrier to accessing anaesthesia services— but they may also be limited by something harder to counter: dentists’ attitudes

BY ERIN VOLLICK

Do you have adequate access to deep sedation?

Dr. Andrew Adams, a dental anaesthesia specialist who now runs a private dental anaesthesia practice, has spent more than his fair share of time contemplating this question. As part of his master’s thesis last year, Adams designed a survey asking dentists across Ontario to respond to questions about their access to, and utilization of, anaesthesia and deep sedation services. And while some barriers to access are geographic in nature, the survey also suggests that dentists may be underutilizing the services available to them.

Where you live will have a huge impact on dentists’ ability to access anaesthesia and deep sedation, the survey finds. Dentists in the North reported having the least access. In fact, a mere 34.2 per cent of Northern Ontario dentists reported having access to anaesthesia services, whereas 89.4 per cent of dentists in the Greater Toronto Area reported having adequate access to this service for their patients—the highest anaesthesia availability rates in the province.

It isn’t a surprise that the North is underserviced. Conversely, the results regarding utilization rate, meaning that the dentists surveyed either provided or referred one or more patients for dentistry under anaesthesia, are more complex. For instance, despite having the highest rate of access, only 69 per cent of GTA dentists used anaesthesia services, the lowest rate of take-up in the province. Their northern counterparts, on the other hand, at 82.3 per cent, reported the highest utilization rate of the limited services available.

The results of the survey initially ‘stumped’ Adams, who is also a Clinical Associate of Anaesthesia at the Faculty. “We found an inverse relationship. In areas where availability is high, utilization is low. In areas where availability is low, utilization is high.”

So what is behind this up and down logic?

Dentists’ attitudes might be one reason, says Adams. While cost was seen as a significant factor, still, more than two-thirds of respondents that did not utilize anaesthesia or deep sedation for their patients indicated no need—a finding at odds with previous research suggesting that 54 per cent of Canadian dental patients are interested in these services.

“General anaesthesia is not in every dentist’s toolkit,” he says, “and because it’s not something you provide, it’s not something you’re going to offer every patient.”

So how can dentists in southern Ontario overcome this strange divide between availability and utilization, supply and demand? Adams argues for more comprehensive training for DDS students on anaesthesia, since exposure to the service would orient dentists to its essential value to patients as well as its mechanics. A more multi-layered approach could include measures such as a simple screening platform, for instance, so dentists can screen patients for high dental anxiety.

The cost of not providing anaesthesia services is ultimately a price that all of society pays, Adams suggests. “One of the issues we previously identified,” he says, “is that patients with high dental fear who avoid dental treatment are more likely to turn to hospital emergency rooms, which are not always equipped to deal with dental cases.” Similarly, “an estimated 20,000 children in Canada are on wait-lists to get their teeth fixed under general anaesthesia. They will have to wait an average of nine to 12 months, which makes a significant impact on their lives.”

Ultimately though, the data point to one simple conclusion: “Dentists need to get the patient’s perspective,” says Adams. “They need to hear what patients are saying and why.”

A follow-up study is currently underway at UofT Dentistry to examine the question of access from the perspective of patients.
Dr. Michael Pharoah

A generous teacher and a globally influential radiologist who nurtured a world-renowned program— that’s Dr. Michael Pharoah, DDS, MSc, FCD, FIADR. After joining the Faculty in 1977, Pharoah became head of radiology and its graduate program director in 1988. He held both positions for 22 years and was named Professor Emeritus when he retired in June 2015.

Pharoah furthered the art and science of diagnostic radiology, both at UofT as well as internationally, by focusing on the potential of radiology images to aid in understanding disease mechanisms. He published widely, describing the imaging characteristics based on disease mechanisms of abnormalities of the maxillofacial bones—an included this philosophy in his version of the classic textbook White and Pharoah’s Oral Radiology (Editions 4 through 7, 2000-2014), which has been translated into numerous languages. Pharoah also advanced radiology education through the development of a unique, case-based seminar series that helped his graduate students achieve high-level diagnostic abilities, and founded an innovative Special Procedures Clinic that accepted patients with various diseases for advanced diagnostic imaging.

The Faculty honoured him for exemplary teaching with the A. Bruce Hord Master Teacher Award in 2004.

Pharoah added voluntarily on both provincial and federal boards. He was on the editorial board of several academic journals, principally Dentomaxillofacial Radiology, and served as President of both the Ontario Academy of Oral Radiology and the Canadian Academy of Oral and Maxillofacial Radiology. He was elected a fellow of the Royal College of Dentists of Canada in 1986 and named Cline Fisst Lecturer for the American Academy of Oral Radiology in 2004.

Dr. Carolyn Poon Woo

Dr. Carolyn Poon Woo DDS is one of the Faculty’s most committed volunteers, a true example of giving back to the dental profession and an inspiring mentor to UofT students.

Poon Woo’s successful practice in Toronto’s Bloor West Village represents just one portion of her commitment to dentistry. She has been a volunteer with the Faculty of Dentistry Alumni Association since 1990, joining the board in 2000 and serving as President from 2006 to 2009. She has helped with fundraising, served on the Gala executive committee, and chased sponsorships and donations for the silent auction. In addition, she has devoted hours to UofT students, inviting them to job shadow and hosting mentorship nights. She also taught in the Department of Oral Radiology from 1986 to 1991.

As a volunteer, Poon Woo has coordinated a gift of radiology equipment upgrades from the Club to the Faculty. She has just completed a term as President of the West Toronto Dental Society and currently sits as Secretary of the Canadian Dental Protective Association. In addition, Poon Woo is a Contributing Consultant for Oral Health Magazine.

In all these positions, she has worked to forge stronger links between dental associations and the Faculty. Poon Woo has provided restorative dental care to the children of Kitchenuhmaykoosib Inninuwug First Nation, to physically disabled patients in Northern Ontario and to low-income populations in Guatemala and Colombia.

UofT honoured Poon Woo with an Arbor Award in 2008 for her leadership in Faculty volunteering. She is an honorary fellow of the Pierre Fauchard Academy, and has been inducted into the American College of Dentists and the International College of Dentists.

Dr. Tom Harle

In Canada and around the world, dental care is still too expensive for the people with the lowest incomes. So Dr. Tom Harle DDS, MD, Dip Prosthodontics, GTo MSc, has dedicated his career to providing accessible care to the most disadvantaged.

At UofT in the 1980s, Harle graduated first in his class, winning the Alpha Omega Prize. He launched a full-time private practice first in his class, winning the Alpha Omega Prize. He launched a full-time private practice.

Harle’s social responsibility efforts have earned recognition from various organizations including the Canadian Dental Association in 2001 with an Oral Health Promotion Award and from the Ontario Dental Association in 2012 with a Community Service Award. Harle was named a member of the Order of Canada in December 2014.

Cambodia and even North Korea. In 2007, Harle launched a dental clinic at the Ottawa Mission homeless shelter where more than 100 volunteer dentists, hygienists and support workers provide 1,200 no-cost patient visits every year. And in 2012, he founded the Portable Outreach Dental Service. The mobile clinic offers free care to teen moms and their children, in partnership with the Young Parent Support Network of Ottawa.

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WHAT IS ACCESS TO CARE AT THE FACULTY OF DENTISTRY?

IT’S 430 students and 119 graduate students taught by 72 faculty members and 500+ clinical associates and 100+ staff members working across 14 clinics serving 15,000+ patients sitting in 293 chairs.

It’s the scores of practice hours on patient simulators, 3D anatomy simulators and case conferences. It’s the hundreds of treatment hours logged in the Emergency Clinic, Oral Diagnosis Clinic, laboratories and all the undergraduate and specialty clinics. It’s the staff who hand out the instrument trays as the clinics open, and the men and women who sweep the clinic floors once they’ve closed. It’s a DDS student who stays up half the night putting together the best possible case she can for the Access to Care Fund panel, so that 81-year-old Mrs. Meyers can get the new set of dentures she’s needed for a dozen years or so.

Most of all, it’s the collective passion, dedication and skills we draw upon every single day to provide an essential health service to an entire community in need of care.

SAVE THE DATE:
SATURDAY, APRIL 2, 2016
SHERATON CENTRE TORONTO HOTEL

26 • UNIVERSITY OF TORONTO FACULTY OF DENTISTRY
We wish to express our thanks to the following benefactors who have made gifts to the Boundless campaign at a level of $25,000 or more. We are grateful to all our donors for joining us to make a transformative difference in the well-being of Canadians and others around the world for generations to come.

THE BOUNDLESS CAMPAIGN has engaged almost 2,000 alumni and friends with the Faculty of Dentistry’s top priorities and has helped to drive new levels of support for students, patients, the teaching clinics, research and innovation. To date, the Campaign has raised more than $14.2 million, advancing our work as a leading dental school creating, translating and disseminating knowledge and treatments that improve lives.

BOUNDLESS: THE CAMPAIGN FOR THE UNIVERSITY OF TORONTO

We strive to make our lists as accurate as possible. For more info, or if you have questions about the donor listing, contact Miriam Stephan at (416) 979-4775 or miriam.stephan@dentistry.utoronto.ca.

LOOKING FORWARD, GIVING BACK

Dr. Robert (Bob) Dunlop was a popular long-time clinical instructor at the school and pillar in the Bayview-Eglinton area of Toronto where he operated a practice for 40 years.

The late Dr. Dunlop’s dedication and commitment to dental students at UofT is living on through his generous benefaction to the Faculty through his will. The Robert B. Dunlop Award has provided support to almost 50 students, including Trevor Thang (pictured page 29).

Gift planning allows alumni and friends to honour their connection to UofT Dentistry, support programs of special importance and advance positive change through UofT’s teaching, research and clinical care mission. There are many convenient, affordable and tax-smart ways to make a strategic donation tailored to individual goals, needs and timelines.

For more information, contact Kimberley Wright in UofT Gift Planning kimberley.wright@utoronto.ca or (416) 978-5510. Or see boundless.utoronto.ca/how-to-give/bequests/

LASTING LEGACIES

The Faculty of Dentistry recognizes donors whose gifts were made through realized bequests, trusts or insurance of $25,000 or more, received during the Boundless Campaign through April 30, 2015.

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Miet and Wanda Kamienski

$100,000 TO $999,999

David Locker

Robert Dunlop

Guy and Eunice Poyton

John and Doris J. Richmond

$25,000 TO $99,000

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David Locker

Robert Dunlop

Guy and Eunice Poyton

John and Doris J. Richmond

$25,000 TO $99,000

1 Anonymous Donor

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BOUNDLESS: GRATITUDE

“It’s good to know that I can continue striving for my dreams and not be limited by a lack of funds.”

TREVOR THANG, DDS 4
LEADING GIFTS MAY 1, 2014 – APRIL 30, 2015

Our annual donor listing recognizes the generosity of donors who have made new gifts or pledges to the University of Toronto, Faculty of Dentistry of $1,000 or more.

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Bonnet Microsurgery
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Dental Services Group of Toronto

$25,000 OR MORE
Jose da Costa
Donna Crossan
F. Bruce Burns

$1,000 TO $1,826
Anonymous Donor

OBITUARIES

WE REMEMBER...

DR. JOHN FASKEN 770 DDS, 777 DIP ORTHO
Well-loved for his gift of storytelling, Dr. John Fasken passed away unexpectedly in August 2015 at the age of 68. As a UofT student, Fasken won an Albert E. Webster Memorial Scholarship for having the best clinical skills in his class. He put those to good use, first in a stint in First Nations communities in the Northwest Territories, then in his Oakville, Ontario practice. He taught at the Faculty for nearly 40 years as a clinical instructor in Endodontics, and was a loyal donor to the Faculty. In both 2002 and 2009, his Orthodontics students voted to honour him with the Marley G. Badner Memorial Award for exceptional dedication to orthodontics education. He was a member of the Ontario Dental Association and of the Halton Peel Dental Association.

DR. ERNEST LEWIS 7T7 DDS
Dr. Ernest Lewis passed away peacefully in September at the age of 81. A practising dentist for 44 years who focused on endodontics in the later part of his career, Lewis loved hockey and was thrilled to be able to serve as the official dentist for the Toronto Maple Leafs – and for Team Canada during the Canada Cup and World Championships tournaments. He was a fellow of the American College of Dentists. Lewis was also the editorial board member for Ethics and Jurisprudence for Oral Health Journal and became well known throughout Canada for his articles on risk management and legal issues pertaining to dentistry.

DR. M. ROLLIN M. MATSUI 779 DDS
Dr. Rollin Matsui passed away in November 2015. As both a practising dentist and a practising lawyer, he was a founder and president of the Health Law Association of Osgoode Hall Law School. He was also the editor-at-large for the Canadian Dentist and a member of the Canadian Dental Association, the Anderson Study Group, the South Asian Dental Association and the Phi Delta ‘Ph’ International Legal Fraternity. Matsui was committed to family and community. He cherished his Japanese-Canadian heritage and was a member of the Japanese Canadian Cultural Centre and the National Association of Japanese Canadians. His son, Robert Matsui 173 DDS, is a graduate of the Faculty.

NOBILITY

Emery Brancaccio 5T7
Arthur J. Bogia 4T6
Dorothy A. Buchkait 4T5 Dent Nursing
Norman Duff 5T7
John Fasken 770, 777 Dip Ortho
Arthur Fisch BTT
Pinar Esenturk 6T8
Michael Kapsevicius 4T3, 4T8 Dip Ortho
Ernest Lewis 5T7
Louis London 5T2
Rollin M. Matsui 779
J. Hunter McCracken 5T1
Robert McKayg 5T5
Paul H. Newman 7T1
Butta Notas 5T8 Hygiene
Janne Shaie E14
Lisa M. Sheridan 4T3 Dent Nursing
William “Tave” Takawan 5T1
Nai Wu Wang 5T3
Halik C. Whelan 7T4 Hygiene
Pinar Wilmuth 4T9
Ruth M. Wright 4T4 Dent Nursing
Egile Varranco 4T8

Listings are as accurate as possible as of press time.
THURSDAY, MARCH 17
ALUMNI RECEPTION
AT PACIFIC DENTAL
CONFERENCE
6 p.m. – 8 p.m.
Pan Pacific
Vancouver Hotel
300-399 Canada Place
Vancouver

Dean Daniel Haas
cordially invites alumni
for a cocktail reception.
RSVP by March 11 to
sabrina.martinez@
dentistry.utoronto.ca

MARCH 17-18
DENTANTICS 2016
6:30 p.m. Doors Open
7:00 p.m. Curtain
Isabel Bader Theatre
93 Charles St. W.,
Toronto

Enjoy the 96th annual
Dentantics with class-
mates or your entire
practice. Proceeds
proudly support the
Faculty’s Access to
Care Fund. Tickets $20
at alumni.utoronto.ca/
dentantics2016

SUNDAY, MARCH 20
SHARING SMILES DAY
2016
10 a.m. – 2 p.m.
Oakville, ON

Alumni are welcome to
join students, staff, and
faculty for this outreach
event with persons with
special needs, including
games, a luncheon with
musical entertainment,
and interactive oral
hygiene demonstrations.
More info? Contact
the student Co-Chairs
of Toronto Oral Health
Total Health: ohth-
toronto@gmail.com.
Website: www.ohth.ca

SATURDAY, APRIL 2
2016 AWARDS OF
DISTINCTION GALA
6 p.m. Cocktails
7 p.m. Dinner

Sheraton Centre
Toronto Hotel
Grand Ballroom
123 Queen Street West
Toronto

Proudly honouring the
2016 award recipients,
Dr. Tom Harle, Dr.
Michael Pharass, Dr.
Carolyn Poon Woo.
Raising funds in support
of the Access to Care
Fund and the Teaching
Clinics Fund.
Order tickets online at
my.alumni.utoronto.ca/
gala2016

SATURDAY, APRIL 9
ODA PRESIDENT’S
CUP HOCKEY GAME
Thompson Recreation &
Athletic Centre
University of Western
Ontario
Western Rd. & Lambton
Dr., London, ON

Students invite alumni
to cheer on the U of T
Dents versus Western
Mighty Dents. For
information contact
jacob.fitzgerald@mail.
utoronto.ca

MAY 5-6
ODA ANNUAL SPRING
MEETING
Booth #919
Metro Toronto
Convention Centre
South Building
222 Bremner Blvd
Toronto

Stop by to visit with
Dean Daniel Haas or
catch up with clinic staff.

MAY 5-7
CLASS REUNIONS
If you graduated in a year
ending with a 1 or a 6,
don’t miss your class
reunion!
For information, or if you
are interested in
organizing your reunion,
please contact miriam.
stephan@dentistry.
utoronto.ca or (416)
979-4775

QUESTIONS OR SPONSORSHIP INQUIRES?
Contact Sabrina Martinez,
Manager of Alumni Relations, at
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