DALHOUSIE UNIVERSITY
Inspiring Minds
DAL Surgery

THE UPDATE

June 2007

Message From the Department Head

Dr. Jaap Bonjer

DAL SURGERY stands for high quality innovating surgical care and inspired clinical and basic surgical research in Eastern Canada. The Dalhousie Department of Surgery has 84 Faculty members in Capital District and 9 cross appointees, 8 Faculty members in Nova Scotia outside of Capital Health, and 48 Faculty members in New Brunswick. Under the auspice of *DAL Surgery* the collaboration between Faculty members will be enhanced and the Faculty will be expanded eliminating virtual boundaries between Districts and Provinces. The potential clinical and scientific strength of a Surgical Network in Eastern Canada is unlimited.

I want to acknowledge our Research Director Dr. Greg Hirsch for leading the *DAL Surgery* research mission. Dr. Hirsch launched the *DAL Surgery* concept and brings tremendous energy and scientific guidance to the entire Faculty. Dr. Greg Hirsch and the Research Office Administrator, Elaine Marsh will distribute the *DAL Surgery Update* semi-annually.

I would like to extend congratulations to Dr. Ivar Mendez for acquiring the remaining funding to establish the Life Sciences Research Institute. This institute is pivotal to enhance basic scientific research in Eastern Canada and to attract more leading researchers.

The Skills Centre for Health Sciences is under construction in the basement of the Bethune Building at the Victoria General Hospital site in Halifax. This facility will open its doors in September 2007 to all health care professionals who wish to learn new skills.

The Residents Research Day on April 3, 2007 was a testimony of excellent research conducted by residents and Faculty of *DAL Surgery*. Great attendance and outstanding spirit marked a day well organized by Elaine Marsh.

Yours sincerely,

Dr. Jaap Bonjer
Professor and Head Department of Surgery

IN THIS ISSUE

IMPORTANT DATES

June 27, 2007
A.S. MacDonald Lectureship
& Golf Day

October 19, 2007
Research Opportunity Day

April 2, 2008
DAL SURGERY
Research Day

THE UPDATE

This is a publication of
DAL SURGERY.
This will be published
by the *DAL SURGERY*
Research Office.

Please forward any comments
And ideas for contributions to:

Elaine Marsh
Department of Surgery
Research Office
RM 2006, HI
1796 Summer Street
Halifax, NS B3H 3A7

Editor: Dr. Greg Hirsch
Production: Elaine Marsh
elaine.marsh@dal.ca

DEPARTMENT OF SURGERY ADMINISTRATION

Crystal Marsman
Executive Assistant
To Dr. Jaap Bonjer
Head, *DALSurgery*
crystal.marsman@dal.ca

Theresa Halliday, CGA
Financial Coordinator
theresa.halliday@dal.ca

Giselle Romans
Administrative Assistant
Financial
Giselle.romans@dal.ca

Sheila Reid
Education Coordinator
Department of Surgery
sheila.reid@dal.ca

Nadine Loppie
Education Coordinator
Division of Orthopaedics
nadine.loppie@dal.ca

Brad MacDonald
IT Coordinator
bradmacdonald@dal.ca

Message From the Director of Research
Dr. Greg Hirsch

DEAR COLLEAGUES

The Spring edition of the *DAL Surgery "Update"* sports a new name and a new look from previous editions of the "Beacon". Some things, however, haven't changed. This includes our Department's support of our Research Mission, Installments of the "Update" are planned to keep the members of The Department abreast of the research opportunities and accomplishments within our community.

This Spring brings much good news about the accomplishments of our Department Members which is related in detail in this inaugural edition. Among these is the tremendous showing of resident and student research presented at this year's Department of Surgery Research Day. It is evident to me from that day's experience that we are building excellent research capacity for the Maritimes and across Canada through our post graduate and graduate training programs.

A.S. MacDonald Lectureship in Surgery

Dr. A.S. MacDonald

This year's A.S. MacDonald Lecturer in Surgery is DR. HANS JEEKEL
Erasmus University, Rotterdam

2005: Dr. Cady Blake –
Boston City Hospital

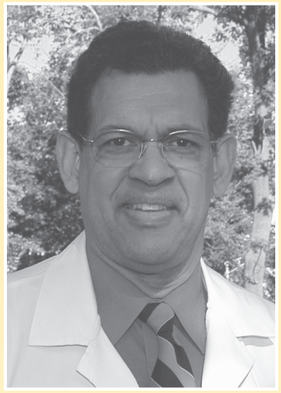
2006: Dr. Bill Wall –
London Health Science Centre

JUNE 27, 2007

2005 marked the first A.S. MacDonald Lectureship in the Department of Surgery. This lectureship occurs every June, where the invited speaker presents at Grand Rounds and then participates in the Annual *DAL Surgery* Golf Day! Dr. A.S. MacDonald is a retired transplant surgeon from Dalhousie, and in his honour and testimony to his great career, and all invited speakers are recognized for their significant academic contributions to the practice of surgery. Drs. Geoff Porter, Bjorn Nashan, Gerry MacKean and Kevork Peltekian make up the A.S. MacDonald Lectureship Committee.

http://surgeryresearch.medicine.dal.ca

Faculty Profile
Dr. Renn Holness



DR. RENN HOLNESS has been the Director of Education for the Department of Surgery from 1999-2006. Dr. Holness is a graduate of the University of West Indies Medical School, where he was the overall gold medallist in the class of 1968. Since Graduation, Dr. Holness' desire to contribute to medical education is well known in our *DAL Surgery* community. His dedication to advancing education in the clinical setting is highly appreciated, both with medical clerks and residents, and has provided an incomparable experience for our future surgeons.

Dr. Holness stepped down as Education Director in December 2006, and his impact on medical students is made evident through the relayed experience from Victoria Bonn, medical clerk who shares, "It has been an honour to learn under the guidance of Dr. Holness for my clinical elective experience. For his students, he has been generous with his time, his knowledge, his respect, and his trust. He continually demonstrates compassion for his patients, and stresses the importance of teamwork in providing them with the best possible care. His passion for the practice of neurosurgery is without question."

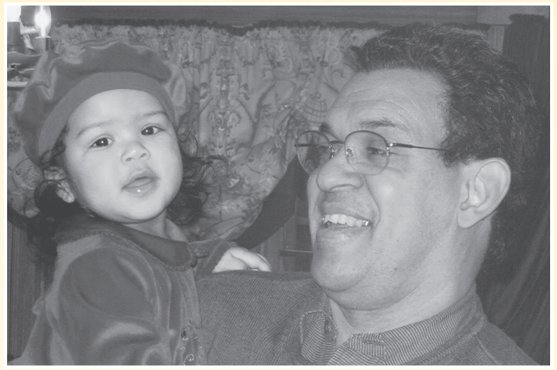
Meena Natarajan, a medical clerk learned first hand the humanity and compassion Dr. Holness ultimately models for his students. She shares this experience of her time with Dr. Holness, "At the end of the day before going home, he would always stop in to see the patient and his or her family, to check on the condition, or just have a social visit, because he knew the therapeutic value of both."

To embrace both the teacher and the physician is a balance Dr. Holness has achieved. Dr. Holness is a well-respected neurosurgeon and places the teaching of the neurosurgery residents very high on his personal agenda. Dr. Mihaly Kis, PGY4 writes "It is impossible to properly do justice to Dr. Holness' contributions to his residents. He is truly passionate about teaching and is a gifted educator. He has a lexiconic knowledge of anatomy, and when it comes to surgery he really has seen it and done it all. He allows his residents freedom and independence in the OR. We are never uneasy when calling him at night because when it comes to his patients he is never off call. All his talents aside, it is the intangibles that truly make him great, and it is these gifts that we all strive to learn from him the most. His intuition, his empathy, and his uncanny calmness when everything is going wrong are qualities that surgeons aspire to but few truly possess. He has taught and shaped generations of surgeons and is shaping generations more. We are truly thankful and fortunate to have been taught by him."

Dr. Holness is the recipient of The Distinguished Graduate Award from his alma mater, and has held positions as the Department of Neurosurgery, Head (1987-2000) and Secretary of the Canadian Neurological Society (1992-1994). He then went on to be President of the CNS in 1995. Dr. Holness was honoured with the 2005 Dr. John Savage Memorial Award in International Health for his outreach work in the Caribbean. In 2000 Dr. Holness was named Dean of the Nassau campus of the UWI Medical School. Dr. Holness has also been awarded the Distinguished Award from the Royal College in 2005 for his contribution to education.

As Dr. Holness steps down, Dr. Brock Vair has been appointed as Director of Education for the Department of Surgery effective March 1, 2007. Dr. Vair brings a wealth of experience and expertise in surgical education to the Department.

Congratulations Dr. Vair!



Dr Holness with grandaughter Mikaila

Research Profile

Bone Conduction Hearing – *Atlantic Innovation Fund of 4.0 Million Dollars*

EVERYONE KNOWS you need the ear canal, eardrum and middle ear to hear, this is what we experience everyday. When you plug your ears, or they get blocked, you can't hear much. This is true in the everyday world; but there is a second way to hear that isn't much used in our lives day to day. This is through something called "bone conduction". In this mechanism, vibrations of the skull directly are transmitted through to the inner ear fluids, and you can hear perfectly well through this. We have been using this mechanism for decades to test hearing disorders, to determine where the problem is. If people can't hear through earphones but can hear well through skull vibrations, this means the inner ear is OK, and the problem is a blockage somewhere in the sound conduction pathway ("conductive hearing loss"). If both the skull vibration hearing and the earphone hearing are equally reduced, this means the inner ear or nerves are themselves damaged ("sensorineural hearing loss").

Some people rely on bone conduction hearing, because they have no other choices for hearing. Examples are those who are born without ear canals (atresia), or who have a conductive hearing loss but can't wear hearing aids because they have severe ear disease which is always draining and discharging. Traditionally this was done by putting a big steel band on the head to compress a vibrator into the skull. The vibrator was powered by a transducer that converted sound to vibration. This certainly is better than nothing, but results in pain, headaches, cosmetic lack of acceptance (particularly for children), and the skin reduces a lot of the vibration getting through. However, these patients have no other choices for hearing, and had to tolerate these cumbersome devices.

Over 3 decades ago, it was discovered accidentally that Titanium would bond directly to bone (i.e osseointegrate). This has been exploited in dental implants for years. This mechanism was subsequently exploited for bone conduction hearing by screwing in a titanium fixture in the skull and letting the skull bone bond to it. A piece of the fixture was left protruding through the skin, and a vibrator was coupled to this protrusion. From this came Bone Anchored Hearing Aids (BAHA). This solved the problems of the previously needed tight head band, and these are much more cosmetically acceptable. This was certainly a revolution in conductive hearing loss rehabilitation, and there are thousands of patients worldwide who have benefited from this. At Capital Health, we run one of the biggest BAHA programs in Canada.

While BAHA devices have developed in sophistication over the years, they still have problems. A surgical procedure is required, a skin graft is needed over the site, healing takes about 3 months and requires dressings, there are ongoing care issues to prevent granulation tissue and infection around the skin penetration site.

A much better solution would be if we could solve the problem of coupling to the skull without a surgical procedure, or a large compressive band to press onto the skull.

This is hampered by the fact that our understanding of how bone conduction works is in its infancy, we really don't understand the mechanisms in the skull vibration patterns that allow hearing to take place, and without these, it is difficult to refine and improve this technology.

Our research, and part of our $4 million Atlantic Innovation Foundation grant ($2.8 million from AIF, the rest includes contributions from partner organizations including the Dalhousie Medical Research Fund, Dept. of Surgery, and completed by our other grants), is to partner with the company that makes BAHAs (Bone Anchored Solutions, based in Sweden. This is a subsidiary of Cochlear Corporation based in Australia).

We will generate new insights into how the skull vibrates with transducers, and how this translates into hearing. We will investigate new vibration materials that might be much more efficient vibrators, and develop new coupling mechanisms to the skull. We will map out the skull to find sweet spots for hearing transduction, and built finite element models of the skull so we can produce prototypes of new devices in software before testing in humans.

This technology, if perfected, provides a "private listening channel", because no-one else can hear what the wearer is hearing, and it could also have major applications in cell phones, personal entertainment devices, and security.

This project allows us to buy state of the art vibration measuring equipment, a $1 million 3-D laser Doppler scanning Vibrometer, in addition to some sophisticated acoustics generation and audiologic suites. I understand the only other 3D laser Doppler of this type is in the Dept of Defence in the US. In addition we recruit some new highly qualified personnel (engineers, audiologists, technicians) to the Atlantic region.

This will lay the foundation for a hearing technologies cluster that could rapidly expand to other projects. Our group is multidisciplinary, and represents partnerships between several Faculites at Dalhousie, UNB, and the Department of Defence.

Hearing disorders are rising rapidly, being the 3rd commonest chronic condition in the elderly, after hypertension and arthritis. New hearing technologies are needed to solve the communication problems these people face, and our group will be almost unique in Canada in its ability to generate new solutions.

Clinical Investigator Program

The Department of Surgery has excellent young clinical scientists currently enrolled in the CIP Program.

Dr. Ansar Hassan, PGY 6 Cardiac Surgery Resident successfully defended his PhD thesis "Geographic and Socioeconomic Determinants of Health Service Utilization and Clinical Outcomes in Ischemic Heart Disease Patients in Nova Scotia" on March 19, 2007. Dr. Jack Tu from the University of Toronto was present as the external examiner. Congratulations Dr. Hassan!

Dr. Lara Williams has returned to her clinical duties after successfully defending her Masters work "The Interaction of the Wnt/-catenin signaling pathway and the caudal-related homeobox genes, CDX1 and CDX2, in the molecular pathogenesis of esophageal (Barrett) adenocacinoma on April 19th, 2007, Congratulations Dr. Williams!

Dr. Dimitri Kalavrouziotis, continues with his Masters studying the "Cardiac Medication Use Following Coronary Artery Bypass Graft Surgery". Dr. Kalavrouziotis, was also successful in being selected to present his abstract, "Preoperative Atrial Fibrillation Decreases Event-Free Survival Following Cardiac Surgery" at this years Dal Surgery Research Day.

Dr. Jane Watson-Jessome continues to pursue her Masters in Medical Science. Dr. Watson's area of concentration continues to be immune responses in mice against tumour antigens. She is working particularly on melanoma and cervical cancer.

Any resident interested in the Clinical Investigator Program is welcome to get in touch with Dr. Greg Hirsch in the Research Office. There are salary awards open to competition. The Research office is always able to help, please make an appointment by contacting Elaine Marsh @ 473-4615

Canadian Foundation for Innovation – 5.5 Million Dollars

Submitted by Ryan McNutt

ON THE WALLS of Dr. Rob Brownstone's office are two white boards, filled with a complicated assortment of stick figures and colourful lines. These sketches are just one way that Dr. Brownstone and his team visualize the networks within the human spinal cord that guide our every step.

Dr. Brownstone is a leading researcher in another important network: the Brain Repair Centre. Founded six years ago as a partnership between Dalhousie University, Capital Health, the IWK Health Centre and the National Research Council, the centre has received international attention for the work of its researchers. Dr. Brownstone is part of a group of spinal researchers that study the intricate networks of cells, nerves and processes that comprise the human spinal cord.

Over the last century, it has become clear that the spinal cords of animals, and likely humans, contain the basic circuitry necessary to produce walking. "The brain has delegated the pattern of activation of the various limb muscles to the spinal cord," says Dr. Brownstone. "The brain tells the spinal cord when to start and stop walking and to beware of obstacles, but the spinal cord contains complicated networks that intricately govern the timing and pattern of muscle activation. We do not yet understand exactly how the spinal cord does that."

Over the past 20 years, Dr. Brownstone's work has dramatically improved that understanding. One of his main areas of focus is motor neurons, the nerve cells that connect the spinal cord to the body's muscles and are responsible for all movement, from chopping down a tree to putting one foot in front of the other. When these cells malfunction or die, some of the most debilitating neurological diseases, including ALS, result.

"Knowing how something works gives you a much better chance of being able to fix it," notes Dr. Brownstone, explaining that one of the Brain Repair Centre's strengths is that they're well-situated to translate their research into actual progress for patients. Training stem cells to behave like motor neurons, the group's members develop new strategies and techniques for helping understand and rebuild spinal networks. They use state-of-the-art equipment to do so, including an advanced two-photon excitation microscope purchased with funds from AIF/ACOA, the QEII Foundation, and the DMRF.

In fact, the spinal cord group has attracted numerous grants and awards for their work. Its members hold various CIHR grants, include a Canada Research Chair Tier II, and have received funding from NSERC, Project A.L.S. and the Christopher Reeve Foundation. Most recently, the group was part of a proposal to the Canadian Foundation for Innovation that received a grant totalling over $5.5 million, among the largest single grant ever received by Dalhousie University. The money will help consolidate the Brain Repair Centre and purchase new, specialized equipment, allowing the group to continue their groundbreaking research.

Dr. Brownstone attributes the spinal cord group's success to their collaborative nature. "Many spinal cord groups really focus in on one area, like regeneration," he explains. "Instead, we've put together a group with very diverse backgrounds and interests. Our successes come because we all appreciate each other's strengths, encourage collaboration and recognize that we're able to do a lot more as a team than as individuals. That's what this CFI grant represents – instead of six separate research programs, we have one excellent research program where we all work and collaborate together."

The Brain Repair Centre's spinal cord group includes:

Dr. Robert Brownstone, Departments of Surgergy and Anatomy & Neurobiology; Assistant Dean, Research – Clinical Departments

Dr. John Downie, Department of Pharmacology

Dr. Jim Fawcettt, Canada Research Chair in Brain Repair, Departments of Pharmacology and Surgery

Dr. Daniel Marsh, Department of Anatomy & Neurobiology

Dr. Victor Rafuse, Department of Anatomy & Neurobiology

DAL Surgery Research Day – April 3, 2007

Dr. Robert Harrison

DR. ROBERT HARRISON from the Hospital of Sick Children was the ***2007 Gordon W. Bethune Visiting Professor.*** His keynote lecture, "Otolaryngology is more than just surgery; keeping up with new knowledge in auditory science" was received and generated very interesting questions from the audience.

The 2007 *DAL Surgery* Research Committee received over 50 abstracts to grade, and 32 abstracts were accepted for platform presentations.

Dr. Lara Williams receiving top honours from Dr. Robert Stone

~THIS YEARS WINNERS~

Dr. Lara Williams
Division of General Surgery
First Place Resident
Recipient of the Dr. Robert Stone Traveling Fellowship

Dr. Dimitri Kalavrouziotis
Division of Cardiac Surgery
2nd Place Resident

Dr. GP Barnsley
Division of Plastic Surgery
3rd Place Resident

Julie Jordan
Department of Microbiology & Immunology
1st Place Student

TimPhillips
Division of Neurosurgery
2nd Place Student

Janie Astephen
School of Biomedical Engineering
Division of Orthopaedics
3rd Place Student

DAL Surgery Grand Rounds – April 11, 2007

DR. HENRICK KEHLET was invited by Dr. Mary Lynch in Pain Management to address the Department of Surgery at our Grand Rounds. Dr. Mary Lynch heads up ***The Dalhousie Pain Network Speaker Series,*** which is an initiative that has been growing since October 2003. This series of lectures aims to raise awareness about the mechanisms and management of pain across the lifespan. The objective is to invite international experts to address scientists, clinicians and trainees in the Dalhousie community on topics related to pain. This initiative will foster increased collaboration among research scientists, improve knowledge translation from bench to bedside and will improve patient care.

For more information on the Dalhousie Pain Network Speaker Series, please contact Sylvia Redmond: sylvia.redmond@cdha.nshealth.ca

This year's guest lecturer was Professor Henrik Kehlet. He is the Professor of Surgery at the Section for Surgical Pathophysiology, The Juliane Marie Centre, Rigshospitalet, Copenhagen University, Denmark. He is also an Honorary Fellow of the Royal College of Anaesthetists, UK, the American College of Surgeons and the German Surgical Society. Professor Kehlet's research interests have focused on surgical pathophysiology, acute pain physiology and treatment, the transition from acute to chronic pain, postoperative fatigue and organ dysfunction.

"The Prevention of Persistent Postoperative Pain"

Program Profile: Orthopaedics

The Division of Orthopaedic Surgery provides tertiary Orthopeadic care for the Maritime Provinces. It is a very busy center with 16 staff Surgeons. Under the leadership of Dr. J. David Amirault, the Division of Orthopaedic Surgery remains one of the most highly consult-oriented services in Atlantic Canada. This large ambulatory clinical setting has over 60,000 outpatient visits per year.

With such a diverse patient load, the Staff Surgeons cover all the 7 major services offered by an Orthopaedic Surgical Care Centre:

General Orthopaedics:
Drs. Amirault & Reardon

Spine:
Drs. Oxner & Alexander

Trauma:
Drs. Leighton and Coles

Sport Medicine:
Drs. Coady & Stanish

Arthroplasty and Orthopaedic Oncology:
Drs. Dunbar & Gross

Upper and Lower Extremities:
Drs. Glazebrook & Johnston

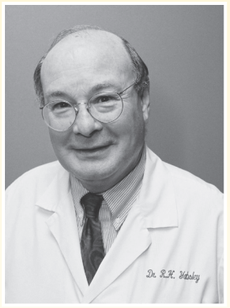
Pediatric Orthopaedic Surgery:
Drs. Hyndman, Leahey, Cook & El-Hawary

The Dalhousie University Residency Training Program in Orthopaedics began in the late 1960s under the Headship of Dr. R.H. Yabsley. The Training Program at Dalhousie is a five-year residency program that provides a strong clinical exposure in all areas of orthopaedic surgery.

Dr. Bill Oxner is the current Resident Training Director and oversees the educational activities and surgical training of 18 residents. The Orthopaedic Residency Program offers strong clinical exposure in all areas of orthopaedic surgery, extensive operative experience, and a well balanced, flexible academic program that is constantly being evaluated and upgraded to meet ever changing needs. The residents in this program develop close working relationships with staff surgeons. Regular group and individual meetings throughout the year are scheduled with the Program Director, the Division Head, Senior Residents, Members of the Resident Training Committee and the Education Coordinator.

Orthopaedic Residents, Nadia Murphy and Adrienne Kelly assessing a patient in ambulatory care

Tradition - Yabsley Day and Resident Research Day



Dr. Yabsley

A WONDERFUL TRADITION was begun in the Division of Orthopaedic Surgery when the first "Yabsley Day" was held. Also known as the "Orthopaedic Resident Homecoming", this day is named in honour of Dr. R. H. Yabsley, the Residency Program founder and the first Chief of Orthopaedics at Dalhousie. There is a great kinship in the Division established through this day, known affectionately as "The Yabsley Club". Each November Yabsley Day is a day long retreat involving current and former Faculty and Residents; Dr. Yabsley graciously does patient and radiology rounds with the invited lecturer and the Residents. There is a Dinner and dance to promote the pride of the long-standing program, and to celebrate both the substantial history and optimistic future.

The complimentary Resident Research Day also happens during the same week in November. "Reseach is an integral part of the Resident Training Program and all Orthopaedic residents are expected to present thier current reasearch projects.

Tradition - Yabsley Day and Resident Research Day
Cont....

The Division also hosts a Visiting Professor who judges the presentations and gives a lecture.

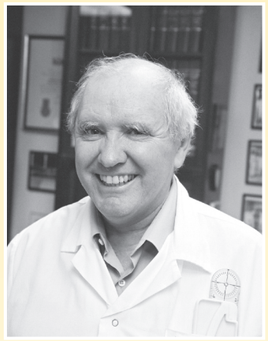
Each resident does two research rotations during their five years of training. The Division proudly has two MD/PhD Faculty members (Drs. Mike Dunbar and Mark Glazebrook) who coordinate resident research with the help of the other staff surgeons. These areas include the broad concepts of Gait, RSA studies, Outcomes, Access to Care, Bio-medical, Trauma, Sports Medicine and all Basic Science areas.

~Orthopaedic Resident Research Day~

2006 Visiting Professors:
Dr. Cheryl Cozy from the School of Biomedical Engineering
Dr. John Ready from Harvard Medical School

Resident Winners:
Best Paper 1st Place: Dr. Darren Costain
Best Paper 2nd Place: Dr. Ben Orlik
Best Proposal: Dr. Andrea Veljkovic

Orthopaedic Research Focus
Dr Lorne Leahley



After two decades of methodical research and development, Dr. Lorne Leahey and his research team have developed a novel and powerful research tool, known as the Walkabout Portable Gait Monitor®. Often referred to as the "gait-belt", it has received international attention and is now being employed in research projects throughout North America. At Dalhousie University, the gait-belt has become one of the core research tools for a plethora of orthopaedic and biomechanical research. The keys to its success are its simplicity, ease of use, and ability to provide high level, powerful and clinically relevant data that objectively quantifies gait parameters. This allows for objective description of musculoskeletal and neuromuscular pathology and enables testing the effects of various interventions on these pathologies.

Dr. Leahey's work began back in the early 1980's, in a period pre-dating the ready availability of personal computers. He was compelled by the clinical need to document and categorize musculoskeletal problems and the lack of a capable tool in the pre-computer era. At that time, clinical decisions were made by interpreting a combination of patient complaints, physical findings, and ancillary investigations (pre CT, pre MRI).

"Having made my own observations while rotating through various clinical rotations, I became convinced that there was no association with the treatment prescription, and I was thinking specifically about total hip replacement and the clinical presentation of the patient findings or pathologic degree of arthrosis seen after procedures were performed." said Dr. Leahey.

Early in Dr. Leahey's training, he was inspired by what he saw at the IWK Children's Hospital. "Here, physicians actually watched musculoskeletally affected patients walk to assess their gait and compensations for their particular problems." Charged with the task of quantifying these compensations in an objective fashion, Dr. Leahey set out to develop a simple clinical tool that would provide the data he required.

His first efforts resulted in a photographic technique known as a gait slide. This consisted of a camera mounted with a motor drive and placed behind a spinning disc that would strobe the efferent light from a subject as they ambulated. A single marker was placed at the approximate centre of mass of the subject

Cont Page 10

Orthopaedic Research Focus

Cont...

so that sagittal and coronal patterns of pathology could be noted. Concepts arising from this work were dynamic leg length difference (uncompensated vertical excursions), surge (variations in forward velocities) and lurch (horizontal translations of the body as a compensation for hip joint or muscle issues). With engineering expertise from DalTech's Departments of Mechanical, Electrical, and Computing Science, a partnership with Norm Green of FEOM and the advent of the personal computer (mid 80's), the concept of three-dimensional centre of mass pathology was translated from a visual to a computer-based system – the first gait-belt.

The initial gait-belt consisted of three accelerometers configured in a tri-axial arrangement, hardwired to an XT computer. The present model, version 6 is a self-contained unit encased in a 7x12 x 2 ½ cm box mounted in the midline lower lumbar region of the subject. It records three-dimensional accelerations at 200 hertz. Data is stored on an SD card and can be instantly downloaded to a computer. Multiple walks (up to 10,000) can be stored on the gait-belt or a long (10 hour) recording session can be undertaken. As such, the gait-belt has become the Holter Monitor of the gait world. The importance of this development needs to be placed into context. Previously, to collect this level of data, a patient would need to spend approximately 90 minutes in an expensive gait laboratory, which requires extensive set-up and systems operation by a highly trained technician. With the gait-belt, clinically relevant data can be collected in as little as five minutes by having the patient walk down a hall with the gait-belt on. Data can be collected by anyone with a brief training session on use of the device. The gait-belt has been well validated against the elaborate and formal "Dynamics of Human Motion Lab" at the School of Biomedical Engineering.

The correlations were outstanding and it is definitive that this simple tool essentially provides data comparable to that obtained from an elaborate gait laboratory - truly a practical and exciting breakthrough.

Another key feature in the new version is an auto processing feature. Literally, with the push of a button, key gait parameters are obtained, computed, and compared to normal values, generating a clinically relevant report. Information in the report includes items such as average velocity, step length, degree of vertical asymmetry (dynamic leg length) or forward asymmetry (surge). Other features include relative powers of the three center of mass dimensions. Simply put, the gait-belt gives information about how much motion is occurring in the vertical, forward, and horizontal dimensions (Figure 1) Generating ratios of these gives information about what type of pathology is present.

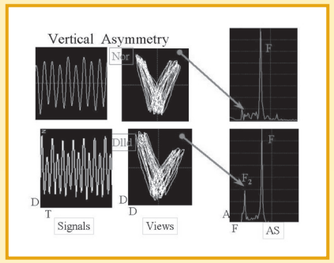


Figure 1: Output data from the gait demonstrating a dynamic leg length discrepancy.

So what is the true value of such a device? It is really only limited by the imagination as the field is wide open. Already, numerous undergraduate and graduate students, residents, and staff have completed successful research projects using the gait-belt. Examples include but are not limited to:

1. Investigating the impact of simulated leg length differences on oxygen uptake while walking.
2. The effect of displaced vs non-displaced fractures of the tibia on gait and speed of healing.
3. The DAL Female Running Team volunteered to help assess the effect of running shoe design on centre of mass movement while running.
4. Impact loading at the lower leg and lumbar region in relation to different footwear and walking surfaces.
5. An Investigation of backpack styles and loads to determine the most efficient style and at what load gait asymmetries develop.
6. A snapshot of 120 total hip patients to see their relative gaits at increasing time post surgery.
7. A double-blind study looking at the gait effects of synthetic joint fluid injections for osteoarthritis
8. Development of a screening and prioritization tool for total knee arthroplasty based on the objective gait data provided by the gait belt
9. Evaluation of anti metabolites in paediatric cancer patients with a view to correlating drug toxicity with parameters of gait.

Retirement: Dr Herman Hugenholtz

"On my very first day, I was amazed at his command of the stairs. I would be running to keep up with him as he scaled the stairs two at a time right up until the day he retired! No elevators allowed when you're rounding with him! He had a vast amount of knowledge and experience that he was always willing to share, and although he didn't suffer fools, if you did something well you were rewarded with a "Nice Job, Kid"

Dr. Ciara Harraher, Neurosurgery Resident

DR. HERMAN HUGENHOLTZ has recently retired from the Division of Neurosurgery after coming to Dalhousie in 1997. Dr. Hugenholtz was recruited from the University of Ottawa, where he was a Professor in Neurosugery, the Training Program Director, and Researcher of Year. Dr. Hugenholtz immigrated to Canada from Holland when he was 10, lived in Toronto and graduated from the Uof T Medical School in 1965 with honours. Dr. Hugenholtz has been an active volunteer in his career ranging from being a member in the Paul Harris Fellow Rotary Club of Halifax Northwest, coaching minor hockey and being the physician for the Canadian Alpine Ski Team. Dr. Hugenholtz has run 2 marathons at age 59 and 61 as a fundraiser for Polio Eradication for the Rotary International.

Dr. Hugenholtz and his wife Bev, who recently celebrated their 40th wedding anniversary in April 2007, are avid travelers and are planning many excursions across the USA in their trailer. They have just returned from New Zealand and Australia as well as a cross country trip of Canada.
Dr. Hugenholtz is living in Fergusons Cove with a large fully equipped workshop with the intention of building canoes and kayaks. He will continue to run and cycle recreationally, but vows no more marathons!

Dr. Hugenhotlz and his wife Bev have two children, Lindsay and Chris. Their daughter-in-law Kerri is expecting their first grandchild.

Good luck Dr. Hugenholtz!

Dr. Hugenholtz with his family
L-R: Chris & Kerri (son and daughter in law), wife Bev, Dr. Herman Hugenholtz and daughter Lindsay

The gait-belt has become a run-away success. The device is now being commercially developed and has been purchased by major research units around North America. It truly has the ability to change how we diagnose and treat patients with musculoskeletal and neuromuscular disorders that affect gait. The genesis can be traced back to Dr. Leahey's intellectual curiosity and his humble ambitions to develop a simple tool that would facilitate better outcomes for his patients. The Department of Surgery, Dalhousie University, and patients and caregivers all over are now benefiting from his diligent, thoughtful, and original efforts. The high tide truly raises all the boats.

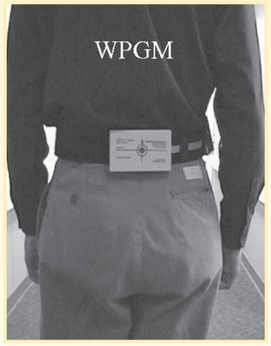


Figure 2: Current version of the Walkabout Portable Gait Monitor®

New Faculty
Dr. Michael Johnston

DR. MICHAEL JOHNSTON

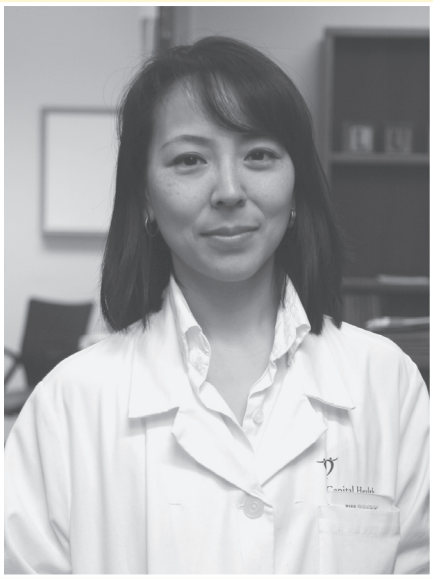
Dr. Bonjer successfully recruited established researcher and thoracic surgeon, Dr. Michael Johnston. Dr. Johnston has recently moved to Halifax, with his partner, Joanne Sulman and has joined the distinguished physicians, Drs. Bethune and Henteleff in the Division of Thoracic Surgery as a Professor of Surgery. Dr. Johnston received his medical degree from the University of Illinois and completed his cardiothoracic surgical residency at the University of Pennsylvania.

As a researcher, Dr. Johnston has been a senior investigator and clinical surgeon at the NIH in Bethesda Maryland and the University of Colorado Health Sciences Centre in Denver.

Before his move to Halifax, Dr. Johnston was a Professor in the Department of Surgery, Division of Thoracic Surgery at the University of Toronto. His clinical practice was based at Princess Margaret Hospital and the Toronto General Hospital. Dr. Johnston's research deals primarily with thoracic oncology, including lung cancer, mesothelioma and tumors of the chest and airway. His laboratory has developed an orthotopic human lung cancer model system in rodents. This model system is used for preclinical screening of novel anticancer agents, and for the evaluation of biomolecular and genetic mechanisms responsible for lung cancer invasion and metastasis. His lab will be relocated to Dalhousie University in the months to come.

Welcome Dr. Johnston!

New Faculty
Dr. Min Lee



DR. MIN LEE

Dr. Lee is a native Haligonian and a graduate of Dalhousie Medical School. She completed her residency in General Surgery at Dalhousie and then went on to complete Vascular and Endovascular Fellowship Training in Ottawa and New Jersery. Dr. Lee has joined the Faculty in January as an Assistant Professor in the Division of Vascular Surgery.
Dr. Lee states " I'm looking forward to working closely with the other members of the vascular department and radiology in expanding our endovascular practice."

Welcome Dr. Min Lee!