2025 RESEARCH DAY
DEPARTMENT OF SURGERY

University of Saskatchewan

Saskatchewan Health Authority

Dr. Michael Kelly

F. H. Wigmore Professor & Provincial Department Head; Knight Family Enhancement Chair in Neurological Surgery

Department of Surgery, Division of Neurosurgery

University of Saskatchewan & Saskatchewan Health Authority

It is my great pleasure to welcome you to our Annual Research Day. The Department of Surgery, comprising over 300 surgeons across Saskatchewan, is supported by our dedicated administrative staff and more than 60 residents and fellows in our postgraduate training programs.

Our unwavering commitment to providing world-class patient care drives us to foster an environment of clinical excellence, innovation, and collaborative research. We aim to be among the leading surgical departments globally.

I would like to acknowledge the outstanding contributions of all our department members, including faculty, residents, graduate students, medical students, undergraduate students, and staff, for their dedication and hard work this year. We remain committed to cultivating a research culture that empowers and motivates our faculty and residents to engage in and excel at research.

Our 2025 Research Day stands as a testament to the determination and perseverance of our department members in advancing our research and academic mission. It also provides an opportunity to express my gratitude to those who work behind the scenes to ensure our department runs smoothly. Special thanks go to our Research Director, Dr. Daryl Fourney, the Department of Surgery Research Committee, and our Research Coordinator, Karen Mosier, for their leadership in our research initiatives over the past year.

We are honored to have Dr. Ziya L. Gokaslan, Professor and Chair of the Department of Neurosurgery, at The Warren Alpert Medical School of Brown University, as our guest speaker this year. I extend my heartfelt thanks to him for joining us in Saskatoon to share his expertise, experiences, and stories.

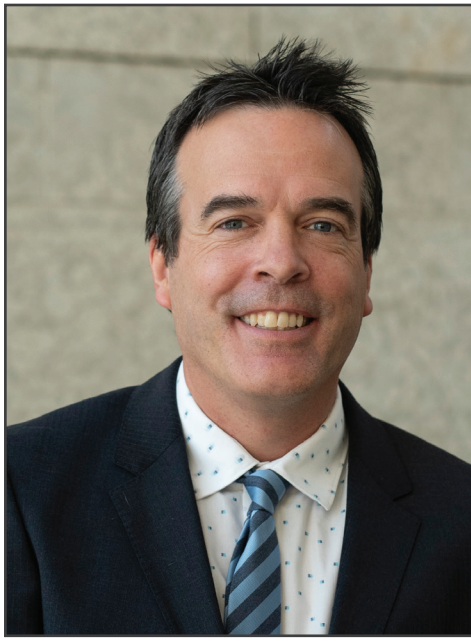
I look forward to an exciting day showcasing the incredible research being conducted within our department.

Welcome to the 2025 University of Saskatchewan and Saskatchewan Health Authority Annual Department of Surgery Research Day!

We will have a full-day program that includes 23 podium presentations and 7 posters. Today, we set aside time in our busy schedules to highlight and honor the ongoing research efforts of our faculty, residents, graduate students, and medical students.

Over the last year, members of our Department published 89 papers and presented at many national and international meetings. The Department provided over $50,000 in internal resident research funding support. We supported 16 Resident Research Incentive Program awards totaling $6,800, 14 Resident Travel awards totaling $28,972, and 3 Resident Research awards totaling $15,000. On behalf of the Research Committee and myself, congratulations to the residents for developing their projects, and a very special thanks to faculty for mentoring our future clinician-scientists.

I would like to thank all of today's presenters, session chairs, and judges. Your contributions are vital to the success of this important celebration. I also give kudos to the Department of Surgery Research Committee for facilitating an excellent scientific program. A special thank you to our invited guest, and my greatest mentor in complex spine surgery, Dr. Ziya L. Gokaslan, Professor, Department of Neurosurgery, Brown University. We are honored to have him join us today. Finally, I would like to extend my gratitude to the Department of Surgery staff for coordinating and promoting today's activities, particularly our Surgery Research Coordinator, Karen Mosier. The behind the scenes efforts of staff are crucial to our success.



Dr. Daryl Fourney

Professor &
Director of Research

Department of Surgery,
Division of Neurosurgery

University of
Saskatchewan &
Saskatchewan Health
Authority

Surgery Research Day
Awards

2024 Award Recipients

Surgery
Faculty Research Day

Platform Presentations:

1st Prize	Dr. Nolan Hunka
2nd Prize	Dr. Eva Liu
3rd Prize	Dr. Mars Zhao
Surgical Foundations Award	Dr. Melanie Elhafid
Undergraduate Surgical Research Award	Sergey Kens
Poster Award: 1st Place	Dr. Mason Beaulieu
Faculty Research Award	Dr. Jans van der Merwe

2023 Award Recipients

Surgery
Faculty Research Day

Platform Presentations:

1st Prize	Dr. Paul Mick
2nd Prize	Dr. Josie Conacher
3rd Prize	Nicole Sylvain

2022 Award Recipients

Surgery
Faculty Research Day

Platform Presentations:

1st Prize	Dr. Nathan Ginther
2nd Prize	Dr. David Sauder
3rd Prize	Elisabet Jakova (Dr. Francisco Cayabyab)
Kloppenburg Award	Dr. Emily Chan
Anne Dzus Student Surgical Award	Barzany Ridha
Surgical Foundations Award	Dr. Eva Liu

2025

RESEARCH DAY

DEPARTMENT OF SURGERY

May 8, 2025

Contents

Introduction

Research Day
Department of Surgery

08:00 AM - 08:10 AM

WELCOME & OPENING REMARKS

Dr. Michael Kelly
Provincial Department Head & Fred H. Wigmore Professor
Knight Family Enhancement Chair in Neurological Surgery
Department of Surgery
University of Saskatchewan & Saskatchewan Health Authority

Dr. Daryl Fourney
Professor & Director of Research
Department of Surgery
University of Saskatchewan & Saskatchewan Health Authority

Session I

Research Day
Department of Surgery
MODERATOR: Dr. Paul Mick
08:10 AM - 09:30 AM

15 Minute Break 9:30 AM - 9:45 AM

Session II

Research Day
Department of Surgery
MODERATOR: Dr. Francisco Cayabyab
09:45 AM - 10:55 AM

Keynote Speaker

Department of Surgery
Research Day

Session III

MODERATOR: Dr. Daryl Fourney

11:00 AM - 12:00 PM

Use of Enabling Technologies in the Treatment of Primary Spinal Column Tumors

Dr. Ziya L. Gokaslan

Professor and Chair, Department of Neurosurgery
The Warren Alpert Medical School of Brown University

LUNCH & Poster Presentation 12:00 PM - 1:00 PM

Ziya L. Gokaslan, MD, FAANS, FACS, is the Julius Stoll, MD Professor and Chair of the Department of Neurosurgery at the Warren Alpert Medical School of Brown University. He serves as the Neurosurgeon-in-Chief at Rhode Island Hospital and The Miriam Hospital. Dr. Gokaslan is also the Clinical Director of the Norman Prince Neurosciences Institute. Furthermore, he leads the Norman Prince Spine Institute at Brown University Health and is the Director of the Complex Spinal Surgery Fellowship at The Warren Alpert Medical School of Brown University.

Dr. Gokaslan earned his medical degree from the University of Istanbul in Turkey. He completed an internship in general surgery, a fellowship in neurotraumatology, a residency in neurosurgery at Baylor College of Medicine in Houston, and a fellowship in clinical spinal surgery at New York University Medical Center. He then returned to Houston and joined the faculty at UT MD Anderson Cancer Center where he later established the Spinal Oncology Program and became its first Director and Deputy Chair in the Department of Neurosurgery. Dr. Gokaslan was then recruited to the Department of Neurosurgery at Johns Hopkins as Donlin M. Long Professor, Professor of Neurosurgery, Orthopaedic Surgery and Oncology, Vice – Chair and the Director of Spinal Surgery Program where he served on the faculty for 13 years and established one of the most respected academic spine programs before joining The Warren Alpert School of Brown University and Brown University Health.

In 2025, Johns Hopkins University established the Ziya Gokaslan, MD Endowed Professorship in Neurosurgery—the highest form of recognition for a faculty member's achievements. This prestigious honor celebrates Dr. Gokaslan's enduring legacy and his transformative contributions to the spine program in clinical care, research, and education, as well as his pioneering work in spinal oncology. One of his former trainees, Dr. Ali Bydon, a distinguished spine surgeon at Johns Hopkins, was named the inaugural recipient of the Ziya L. Gokaslan, MD Endowed Professorship in Neurosurgery.

Dr. Gokaslan is also a recipient of numerous other prestigious awards, including the Leon Wiltse Award to recognize his excellence in leadership and clinical research in spine care by North American Spine Society (NASS), and is also an active member of many professional societies including American Academy of Neurosurgeons, World Academy of Neurosurgeons, and The Society of Neurological Surgeons. He also served as Chairman of AANS/CNS Joint Section on Disorders of the Spine and Peripheral Nerves. Furthermore, he currently serves on the Board of Directors of Brown University Health. His CV contains more than 500 peer reviewed publications, six books and numerous book chapters. His practice focuses on complex spinal reconstruction and radical surgical treatment of both primary and metastatic spinal tumors, sacral neoplasms, and spinal cord tumors, and he is regarded as the World's foremost expert in spinal neoplasms and spinal cord neoplasms.

Dr. Ziya L. Gokaslan

Julius Stoll, MD Professor and Chair

Department of Neurosurgery, The Warren Alpert Medical School of Brown University

Neurosurgeon-in-Chief, Rhode Island Hospital and Miriam Hospital

Clinical Director, Norman Prince Neurosciences Institute

President, Brown Neurosurgery Foundation

Session IV

Research Day
Department of Surgery
MODERATOR: Dr. Melissa Wood
1:00 PM - 2:20 PM

Closing Remarks

Department of Surgery
Research Day

2:20 PM - 2:30 PM

Dr. Daryl Fourney

Director of Research, Department of Surgery | Division of Neurosurgery
Professor, College of Medicine, University of Saskatchewan

The 1st, 2nd and 3rd podium presentation winners and the 1st place poster award winner will be announced at the Department of Surgery Celebration dinner.

Acknowledgments

The Department of Surgery would like to thank the following individuals for serving as judges and moderators for the 2025 Research Day.

Judges

Dr. Uzair Ahmed
Assistant Professor, Department of Surgery
Division of Neurosurgery
College of Medicine, University of Saskatchewan

Dr. Trustin Domes
Associate Professor, Department of Surgery
Division of Urology
College of Medicine, University of Saskatchewan

Dr. Ziya Gokaslan
Professor
Department of Neurosurgery
The Warren Alpert Medical School, Brown University

Dr. Gary Groot
Professor, Department of Surgery
Division of General Surgery
College of Medicine, University of Saskatchewan

Dr. Renée Kennedy
Associate Professor, Department of Surgery
Division of Thoracic Surgery
College of Medicine, University of Saskatchewan

Moderators

Dr. Francisco Cayabyab
Professor, Department of Surgery
Basic Surgical Research
College of Medicine, University of Saskatchewan

Dr. Paul Mick
Associate Professor, Department of Surgery
Division of Otolaryngology
College of Medicine, University of Saskatchewan

Dr. Melissa Wood
Assistant Professor, Department of Surgery
Division of General Surgery
College of Medicine, University of Saskatchewan

2025
Department of Surgery
RESEARCH DAY
PODIUM PRESENTATION **ABSTRACTS**

Small Breast Cancers with Negative Axillary Ultrasound at Diagnosis – Outcome from Sentinel Node Surgery, Impact on Adjuvant treatment, and Assessment of Oncological Outcomes from a Single High Volume Breast Centre in the United Kingdom

Platform Presenter: Dr. Melissa Wood

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Hsin-Tzu Huang (Bristol Medical School, University of Bristol), Ali Hunter-Smith (Royal United Hospital Bath NHS Foundation Trust).

Rationale:
The SOUND trial suggested that in T1 breast cancers, omission of sentinel lymph node biopsy (SNB) does not impact 5-year disease free survival; however, its omission remains controversial.

Methods:
Retrospective analysis of a prospectively maintained database at a single UK centre was performed and compared to the published SOUND trial. Data was analyzed with t-tailed z scores.

Results:
Between 2019 and 2024 in the UK cohort, 426 women underwent SNB for T1 disease. The percentage of those aged 40-49 was lower (11% vs 16%; p 0.02) and those aged over 65 higher (44% vs 37%; p 0.04) in the UK than the SOUND population. Proportion of T1a (6%) and T1b (25%) tumors was lower ($p= 0.04$ and $p < 0.0001$), while T1c tumors was higher than SOUND (UK 62% vs 50%; $p < 0.0001$). There was no statistically significant difference in SNB nodal burden between the two studies. In total, 11 patients (2.6%) may have received a change in adjuvant systemic treatment due to a positive SNB result. Similar 5-year distant disease-free survival (98.8%; $p = 0.11$), distant recurrence (1.2%; $p = 0.39$), and overall mortality (1.2%; $p = 0.11$) were observed.

Conclusion:
Our findings, the largest UK study to date reporting SNB outcomes in T1 tumors, reveal significant differences in patient and tumor demographics between the UK cohort and SOUND trial, but similar oncological outcomes. Thus, SNB omission can be considered in patients with T1 breast cancers, to minimize treatment side effects and optimize quality of life.

Funding Sources:
None

Robotic Esophagectomy Outcomes Following the Implementation of a Robotic Surgical Program in a Canadian Academic Centre

Platform Presenter: Dr. Richard Bigsby

Division of Thoracic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Steven Bharadwaj (Department of Surgery, University of Saskatchewan), Dr. Evan Barber (Department of Surgery, University of Saskatchewan), Dr. Dimitrios Coutsinos (Department of Surgery, University of Saskatchewan), Dr. Gary Groot (Department of Surgery, University of Saskatchewan), Alishba Muzaffar (Department of Surgery, University of Saskatchewan), Andreea Thiesen (Department of Surgery, University of Saskatchewan), Abdullah Questri (College of Medicine, University of Saskatchewan), Dr. Prosanta Mondal, Department of Community Health & Epidemiology, University of Saskatchewan).

Rationale:
The role of Robotic surgery has been expanding for Thoracic Surgery in Canada. We reviewed our first 55 Robotic esophagectomy cases and compared them to our preceding 47 minimally invasive/open cases we did over a 3 year period (excluding emergency cases). We looked at the length of stay(LOS), complication rates, readmission rates and operative times. Lymph node sampling and resection margins were used to assess completeness of each approach. Anastomotic techniques were compared for leak rates and post operative dilatation frequency.

Methods:
Data was retrospectively collected on 102 consecutive patients. Robotic dock times were prospectively collected. Non parametric Anova (3 group comparison) and nonparametric Wilcoxon test (2 group comparison) were used to compare outcomes. Comparisons were made between complication rates (major and minor), operative times, readmission rates, and mortality. Completeness of surgery was measured by lymph node harvest (less than 15 vs 15 and greater), surgical margins as well as conversion rates.

Results:
There was an overall decrease in LOS from 9 days to 7 days without any change in our ERAS program. The proportion of major complications was lowest in the Robotic group vs MIS and open - but was not statistically significant (14.1%, 17.9% and 16.7% respectively). Overall, lymph node harvest and surgical margins were similar amongst groups. Anastomotic complications improved with the use of a double endoloop technique for performing the EEA anastomosis with the Robot. Robotic operative times were longer compared to MIS and open (307min,244 min and 286min respectively). Overall mortality was 4 % and similar with each group.

Conclusion:
Robotic surgery results in similar outcomes compared to MIS and open techniques and was associated with a significant decrease in LOS.

Funding Sources:
None

Canadian Prospective Pragmatic Perilunate Outcomes Trial (C3PO) The Saskatchewan Retrospective Cohort

Platform Presenter: Dr. Omer Alkhateeb

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Neil J. White (Department of Surgery, University of Calgary), Dr. David Sauder (Department of Surgery, University of Saskatchewan).

Rationale:
Perilunate injuries are rare, but serious injuries. Their pathognomonic feature is dislocation of the capitate from the lunate; which can happen either from a ligamentous disruption only or from bony injury as well. The primary aim of this study is to examine the Saskatchewan retrospective cohort with patient long term reported outcomes.

Methods:
We identified and retrieved information of 32 patients with perilunate injury in electronic medical records (EMR). However, we were only able to reach out and include 12 patients who were willing to participate in this study. The inclusion criteria is anyone above 14 years of age clinically diagnosed with perilunate injury. A structured interview and clinical assessment were carried out for the 12 participants.

Results:
In our 12 participants the average age was 31(with SD 10) which all were men. Seven (58.3%) had Mayfield class III, four (33.3%) had Mayfield class IV and only one (8.3%) had Mayfield class II. At the interim follow up visit (which ranged between 3 to 15 years), the mayo wrist score average was 74 (SD of 12). The quick dash scores average was 16 (SD of 16), while quick dash work score average was 15 (SD of 18). The PRWE average was 28 (SD of 23).

Conclusion:
Perilunate injury causes a severe disruption of wrist anatomy. Despite patients having fair mayo wrist scores, the injury only mildly impaired their activity and mildly affected their overall function. This shows that regardless of the substantial ligament disruption and bony injury, patients tend to have good functional outcome overall.

Funding Sources:
Saskatoon City Hospital Foundation Fund

Human Breast Milk Preserves Fatty Transport and Intestinal Integrity in Modeling Necrotizing Enterocolitis Using Human Small Intestinal Organoids

Platform Presenter: Dr. Nolan Hunka

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Amanda Hall (Department of Surgery, University of Saskatchewan), Dr. Gary Groot (Department of Surgery, University of Saskatchewan), Dr. Dean Chamberlain (Department of Oncology, University of Saskatchewan), Farinaz Ketabat (Department of Biomechanical Engineering, University of Saskatchewan).

Rationale:
Necrotizing enterocolitis (NEC) is a lethal condition for preterm neonates, with mortality rates up to 50% and significant long-term complications. Despite advancements in medical care, specific treatments for NEC are lacking. While human breast milk reduces NEC incidence and promotes intestinal adaptation, the precise molecular mechanisms remain unclear and are not replicated by formula. Since enteral feeding is often limited in NEC cases, understanding these processes could reveal therapeutic targets mimicking breast milk's benefits, reducing NEC-related morbidity and mortality.

Methods:
Human organoids, which model the intestinal system and NEC disease process, were used to investigate these effects. Mature iPSC-derived small intestinal organoids were cultured with human breast milk, Enfamil A+ formula, or PBS (control) at a 1:10 ratio. To mimic NEC-inducing inflammation, groups received TNF-alpha and LPS treatment for 24 hours, administered before or after media exposure. Immunocytochemistry assessed epithelial barrier components, while RT-qPCR analyzed fatty acid transport proteins.

Results:
Results reveal that, compared to formula, breast milk uniquely upregulates fatty acid transport genes FABP1, SCARB2, and FATP4. It also better preserves goblet cell populations and tight-junction integrity under inflammatory stress. These findings highlight breast milk's protective role in maintaining intestinal homeostasis.

Conclusion:
Identifying molecular targets like fatty acid transporters offers a foundation for developing therapies that replicate breast milk's adaptive benefits, improving intestinal function in neonates suffering from NEC and related diseases.

Funding Sources:
Department of Surgery Resident Research Award, Clinician Investigator Program

Variability in Neural Stimulation Affects the Response of the Nervous System

Platform Presenter: Dr. Jonathan Norton

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Kulveen Brar (College of Medicine, W M Carey University).

Rationale:
Reflexes habituate with repeated presentation of the same stimuli. In a model reflex with multiple components we showed that habituation was dependent on the number of stimuli, but not the rate of presentation (Harrison et al 2000). We wished to examine if varying the rate of stimulus presentation altered the reflex habituation pattern.

Methods:
Digital nerve stimulation was applied to the index finger of the dominant hand of 15 subjects while a small background contraction of the first dorsal intereosseous muscle was performed. Stimulation was presented at 3 and 5 Hz and also with 10% variability in the rate of stimulation. The order of stimulation was randomized.

Results:
When fixed rate stimulation was presented the rate of habituation mirrored the previously seen study very closely. However, when stimulation had variability in its presentation rate (but not in intensity) the rate of habituation was significantly less ($p<0.05$, ANCOVA) but not zero. This was true for all three components of the reflex.

Discussion:
This is a novel basic science finding, that demonstrates a change in the response of the nervous system to non-regular stimulation, at least at relatively fast stimulation frequencies. Preliminary evidence from slower stimulation of the H-reflex (<1Hz) suggests that this is not replicated. However, many neuromodulation devices stimulate above 50Hz, and for a significant number of patients there is a degree of accommodation to the stimulation (that may be termed habituation). Varying the rate of stimulation may reduce this effect and promote more long-term effects.

Funding Sources:
College of Medicine, University of Saskatchewan.

Cannabis Use in Knee Osteoarthitis

Platform Presenter: Kelly Kizlyk

Graduate Student

College of Pharmacy & Nutrition, University of Saskatchewan

Team Members/Affiliations:

Dr. Anthony King (Department of Surgery, University of Saskatchewan), Holly Mansell (College of Pharmacy and Nutrition, University of Saskatchewan), Erin Yakiwchuk (College of Pharmacy and Nutrition, University of Saskatchewan), Regina Taylor-Gjevre (Department of Medicine, University of Saskatchewan), Mark Lees (Department of Family Medicine, University of Saskatchewan).

Rationale:

Standard nonoperative treatment for knee osteoarthritis includes exercise, physiotherapy, NSAIDs, acetaminophen, injections and bracing. Such treatments have had varying degrees of success with many patients continuing to experience pain and disability. Cannabis has a known effect on pain reduction. Studies have shown cannabinoid receptors in chondrocytes, osteocytes and synovial fluid. This study explores the use of pharmacological agents, in particular, cannabis products in patients with knee OA. Related literature is sparse.

Methods:

Patients with knee osteoarthritis were recruited from an orthopedic surgeon's office and general primary medicine clinics. Questionnaires were given which included questions on demographics, pain, stiffness, physical function, and treatment of their knee OA. Extra questions were given if the patients used cannabis. Data collection involved the Dillman Tailored Design Method and data analysis involved descriptive statistics and severity scores included independent t-test, two-sided, p=0.05.

Results:

205 surveys were distributed. 155 from the orthopedic surgeon's office. 89 surveys were completed with a response rate of 43.4%. The most common age range was 65-74. 49% identified as female. Over 60% of patients had knee OA symptoms for over 5 years. Symptoms were often reported as moderate or severe. 67.4% were using acetaminophen, 43.8% NSAIDs, 48.3% exercise, 25.8% intra-articular injections. 17.6% were using cannabis. Patients who were using cannabis reported improvements with pain(62.5%) and sleep(68.8%). The most common side effect was drowsiness. Cannabis agents included oral, topical and inhaled products.

Conclusion:

Pharmacologic agents emerged as the primary treatment strategy for knee OA. A wide variety of cannabis products were used by a notable portion of patients. Use of these products frequently resulted in decreasing pain and improving sleep. Further research is needed to better understand which cannabis products are most effective in the treatment of knee OA.

Funding Sources:

Internal Funding College of Pharmacy and Nutrition.

The Effects of Lactobacillus Rhamnosus on Intestinal Adaptation

Platform Presenter: Dr. Amanda Hall

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Farinaz Ketabat (Department of Surgery, University of Saskatchewan), Dr. Nolan Hunka (Department of Surgery).

Rationale:
Short bowel syndrome results from inadequate intestinal length or absorptive capacity and relegates the patient to dependence on parenteral nutrition. Limited treatments are available to improve intestinal adaptation. Lactobacillus rhamnosus (L. rhamnosus) and other probiotics are frequently used in the Neonatal Intensive Care Unit to expedite recovery after intestinal infection. However, there is no evidence that probiotics actually stimulate bowel growth. We aim to investigate the effects of L. rhamnosus, using two markers of intestinal adaptation: glucagon-like peptide 2 (GLP-2) and Citrulline.

Methods:
Intestinal organoids were developed, validated, and inverted to expose their apical (absorptive) surfaces. L. rhamnosus was co-cultured with the intestinal organoids for 48 hours. The control organoid group was supplemented with phosphate-buffered solution. Live-dead assays confirmed that both organisms thrived in co-cultures. Intestinal organoids and media were collected separately. GLP-2 and Citrulline levels were measured using ELISA. Immunocytochemistry was used to examine GLP-receptors and Enteroendocrine cells.

Results:
L. rhamnosus triggered a three-fold increase in Citrulline production in the intestinal organoids. However, there was no statistical difference in the GLP-2 production between the treated and control organoids. Further investigation into the GLP-2 pathway showed no change in GLP-2 receptor signalling and stronger enteroendocrine signalling in the control organoids, as compared to the organoids treated with bacteria.

Conclusion:
L. rhamnosus appears to cause significant increase in the absorptive enterocyte mass, as indicated by citrulline levels. However, there is no corresponding increase in GLP-2 levels. Probiotics may have beneficial effects for bowel adaptation, but further research is required.

Funding Sources:
College of Medicine New Faculty Start-Up Fund.

Assessment of Satisfaction of Total Knee Arthroplasty Patients Using CPAK Classification

Platform Presenter: Dr. Mars Zhao

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Thomas Goldade (College of Medicine, University of Saskatchewan), Cole Elaschuk (College of Medicine, University of Saskatchewan), Evan Parchomchuk (College of Medicine, University of Saskatchewan), Janan Ashique (College of Medicine, University of Saskatchewan), Aafia Maqsood (College of Medicine, University of Saskatchewan), Mikayla Rudniski (College of Medicine, University of Saskatchewan), Mason Beaulieu (College of Medicine, University of Saskatchewan), Nathan Oster (College of Medicine, University of Saskatchewan), Jenna England (College of Medicine, University of Saskatchewan).

Rationale:
Total knee arthroplasty (TKA) is a successful operation for osteoarthritis, yet some patients remain dissatisfied despite seemingly optimal component positioning. The Coronal Plane Alignment of the Knee (CPAK) classification, which describes radiographic knee phenotypes, may provide insight into alignment-related outcomes. This study examines whether pre- and post-operative CPAK classifications correlate with Patient-Reported Outcome Measures (PROMs) after TKA.

Methods:
A retrospective review was conducted on 365 primary TKA patients operated on by a single surgeon. Patient demographics, surgical details, and radiographic data were collected. PROMs, including the Oxford Knee Score (OKS) and KOOS-JR, were assessed. Pearson correlation analysis explored relationships between CPAK groups and outcomes.

Results:
A total of 247 patients were analyzed. Preoperatively, 37.9%, 19.6%, and 12.6% were in CPAK 2, 5, and 4, respectively. Postoperatively, 83.4% were classified as CPAK 5. Mean KOOS-JR and OKS scores were 62 and 42, indicating mild pain and satisfactory function. Only 25% retained the same CPAK classification. No significant difference in PROMs was found between matched and unmatched CPAK groups. However, patients with post-operative apex proximal joint line alignment (CPAK 7, 8, 9) had significantly worse outcomes ($p<0.05$).

Conclusion:
Our results suggest that most CPAK group combinations did not impact PROMs, with high satisfaction in CPAK 5. However, patients in CPAK 7, 8, or 9 postoperatively had poorer outcomes. These findings suggest tailoring post-operative alignment based on CPAK may not improve satisfaction, except for avoiding apex proximal classifications.

Funding Sources:
Saskatchewan Centre for Patient-Oriented Research (SCPOR), Department of Surgery Resident Research Award.

Multiple Choice Examinations in Surgery – Correlations with Academic Success

Platform Presenter: Dr. Laura Sims

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Krista Trinder (College of Medicine, University of Saskatchewan).

Rationale:
Surgical education is important in maintaining the best standard of surgical care for future generations. Accurate assessment of surgical learners is complex and often under-evaluated. An in-house multiple choice examination (MCQ) for surgical clerks was created to replace the Surgery National Board of Examiners (NBME) exam. Our study aimed to assess how these exams correlate with overall performance in the clerkship surgery rotation and on the Medical Counsel of Canada Qualifying Examination part 1 (MCCQE1) exam.

Methods:
Multiple choice questions were created by faculty in our Department and edited by the surgical education leadership team over one year. The MCQ was piloted in 2021 and run in tandem with the NBME for 2 years. Results from the MCQ and NBME were correlated with overall grade in surgery and MCCQE1 results for the class of 2023 and 2024.

Results:
Results from 188 students were analysed. Mean scores on the MCQ, NBME, surgery rotation, and MCCQE1 were 65% (SD 7), 78% (SD 10), 85% (SD 5), and 258 (SSD 20), respectively. Pearson Correlation Coefficients showed statistically significant correlations for all measures ($p<0.01$). Linear regression models showed higher scores on the NBME but not the MCQ correlated with higher grades on the surgery rotation ($p<0.01$), and that higher scores in both the MCQ and the NBME independently predicted higher scores on the MCCQE1 ($p<0.01$).

Conclusion:
The NBME better predicted overall performance on the surgery rotation. With continued MCQ modification, the trend seen for this exam may reach significance. Both the MCQ and NBME correlated with results on the MCCQE1. Students who perform well on one assessment tended to do so on all assessments. Accurate evaluation of surgical learners remains challenging and multifaceted, and this study acts as a platform for future growth in this area.

Funding Sources:
None.

Challenging Paradigms: Using Pancreatic Organoids in the Treatment of Pancreatic Cancer

Platform Presenter: Dr. Nicholas Jette

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Omar Abuhussein, Dr. Aanchal Aggarwal, Dr. Shahid Ahmed, Dr. Nezeka Alli, Dr. Connor Denomy, Dr. He Dong, Dr. Tanya Freywald, Dr. Ashtalakshmi Ganapathysamy, Dr. Li Hui Gong, Dr. Cristina Gonzalez-Lopez, Dr. Liliia Kyrylenko, Dr. Mary Lazell-Wright, Dr. Vincent Maranda, Dr. Erika P. Munhoz, Dr. Hardikkumar Patel, Dr. Jared D.W. Price, Dr. Karthic Rajamanickam, Dr. Anjali Saxena, Dr. Franco J. Vizeacoumar, Dr. Jeff P. Vizeacoumar, Dr. Prachi Walke, Dr. Yue Zhang (Department of Oncology, University of Saskatchewan); Dr. Renuka Dahiya, Dr. Andrew Freywald, Dr. Alain Morejon Morales, Dr. Jayme Salsman, Dr. Frederick S. Vizeacoumar (Department of Pathology, University of Saskatchewan); Dr. Dr. Gary Groot, Dr. Yi-Tao Yu (Department of Surgery, University of Saskatchewan); Dr. Anand Krishnan, Dr. Michael Levin, Dr. Patricia Thibault (Department of Anatomy, Physiology, and Pharmacology, University of Saskatchewan); Dr. Hussain Elhasasna (College of Pharmacy, University of Saskatchewan); Dr. Yuliang Wu (Department of Biochemistry, Microbiology and Immunology, University of Saskatchewan); Dr. Christopher Eskiw (Department of Food and Bioproduct Sciences, University of Saskatchewan); Dr. Sabine Mai, Dr. Aline Rangel-Pozzo (Department of Physiology and Pathophysiology, University of Manitoba); Dr. Khaled H. Barakat (Faculty of Pharmacy and Pharmaceutical Sciences, University of Alberta); Dr. Kathryn Nguyen, Dr. Diego M. de Oliveira, Dr. Judy M.Y. Wong, Dr. Jia Lin Xu (Faculty of Pharmaceutical Sciences, University of British Columbia); Dr. Graham Dellaire (Department of Pathology, Dalhousie University); Dr. Peng Gao (Agriculture and Agri-Food Canada); Dr. Hironori Adachi (Department of Biochemistry and 18 Biophysics, University of Rochester Medical Centre); Dr. Ronald A. DePinho (Department of Cancer Biology, The University of Texas).

Rationale:

When asked if he could cure cancer, the renowned surgeon-scientist Judah Folkman famously responded, "Yes, in mice." For decades, cancer research has relied heavily on 2D cell cultures and murine xenograft models, which, while informative, often fail to predict how human tumors respond to treatment due to their unnatural cell interactions and tumor microenvironments. Recently, 3D patient-derived tumor models known as "organoids" have emerged. These organoids, which closely replicate the architecture of the original tumor, represent a promising model for studying human cancer. The application of organoids to pancreatic cancer holds potential for advancing cancer therapy and improving survival outcomes.

Methods:

Pancreatic organoids were derived from primary and metastatic patient tumors. We successfully developed pancreatic organoids in ~70% of patient samples.

Results:

Through synthetic lethal screens we identify FTSJ3 as a novel target for apoptosis in pancreatic cancer cells, validated through our developed pancreatic tumor organoids. Moreover, we identify unique precision chemotherapeutic options for patients being actively treated for pancreatic cancer.

Conclusion:

This work has the potential to revolutionize pancreatic cancer treatment. Currently, pancreatic cancer outcomes are poor with infrequent survival 5 years from diagnosis. We aim to change that paradigm.

Funding Sources:

CIHR, SHRF, Cancer Research Society, NSERC, The Terry Fox Research, Sask Cancer Agency, Be Like Bruce, University of Saskatchewan - College of Medicine.

Associations Between Cognition and Speech Discrimination in Cochlear Implant Candidates

Platform Presenter: Dr. Paul Mick

Division of Otolaryngology, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Natalie Morog (Department of Hearing Health Services, Saskatchewan Health Authority), Jiwon Yoon (Community Health and Epidemiology, University of Saskatchewan), Richard Ngo (Department of Surgery, University of Saskatchewan), Walter Wittich (Ecole d'optometrie, Universite de Montreal), M. Kathleen Pichora-Fuller (Department of Psychology, University of Toronto), and Natalie Phillips (Department of Psychology, Concordia University).

Rationale:
Tests of speech discrimination (SD) with a hearing aid are used to determine cochlear implant (CI) candidacy (lower SD suggests a CI may be beneficial). Traditionally, SD is assumed to be a proxy for the integrity of the afferent auditory signal. Cognition, however, may contribute to SD, particularly if hearing loss is not profound. The objectives were to determine if executive function and/or memory are associated with SD among CI candidates, and whether pure-tone threshold average (PTA; a measure of peripheral hearing) modifies results.

Methods:
Adult participants presenting for CI candidacy assessment were administered the brief visuospatial memory test-revised (BVMT-R), the mental alternation test (MAT), the animal fluency test, semantic fluency tests and the Stroop test. Tests of SD included the AzBio sentence test (in noise and quiet) and CNC word test (in quiet). Associations between cognition and SD were determined using multivariable linear regression. A sensitivity analysis was performed to determine if results differed among a subset of participants with PTA<100 dB HL.

Results:
There were 71 participants (44 with PTA<100 dB HL). SD scores were associated with BVMT-R (total and delayed recall) and MAT; parameter estimates were strongest for participants with PTA<100 dBHL (better hearing).

Conclusion:
The results suggest SD is a function of the afferent auditory signal and top-down processing in CI candidates, particularly if PTA is <100 dBHL. The influence of cognition on SD should be considered when SD is used to make CI candidacy decisions.

Funding Sources:
Saskatchewan Health Research Foundation Establishment Grant.

Irreversible Electroporation for Unresectable Liver Malignancies

Platform Presenter: Zili Zhou

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Chris Wall (Department of Radiology and Diagnostic Imaging, University of Saskatchewan), Dr. Jeff Bird (Department of Radiology and Diagnostic Imaging, University of Saskatchewan), Dr. Shahid Ahmed (Department of Oncology, Saskatoon Cancer Centre), Dr. Gavin Beck (Department of Surgery, University of Saskatchewan), Dr. John Shaw (Department of Surgery, University of Saskatchewan), Dr. Michael A. J. Moser (Department of Surgery, University of Saskatchewan).

Rationale:
While over 80% of colorectal liver metastases are currently resectable with technical advances, some patients still have liver cancers that are unresectable due to their proximity to anatomically sensitive structures. Irreversible electroporation (IRE), a non-thermal ablation technique, offers an option for these patients.

Methods:
We documented the survival and complications of 19 patients undergoing 22 IRE procedures for unresectable liver malignancies between July 2015 and February 2024. All cases were deemed unresectable by a multidisciplinary tumor board due to abutment of hepatic veins or IVC (n=10), recurrence near the hilum after lobectomy (n=4), involvement of the portal vein bifurcation (n=3), and cirrhosis contraindicating resection (n=3). The percutaneous approach was used for 19 of 22 procedures, and the open approach was only used when another procedure, such as colon resection, was performed synchronously.

Results:
Patients had a median overall survival of 36.8 months from the time of the procedure, while patients with colorectal liver metastases had a median survival of 49 months. Local recurrence occurred in 7 of 22 (32%) cases, with a median recurrence-free survival of 27 months. Complications were infrequent; 3 patients reported pain beyond 24 hours, but all settled without the need for any intervention.

Conclusion:
Our medium-sized center achieved outcomes comparable to those reported in much larger centers, further supporting the use of IRE in managing unresectable liver tumors in anatomically sensitive locations.

Funding Sources:
None.

Evaluating the Learning Curve and Outcomes of a New Rectangular Femoral Stem in Total Hip Arthroplasty: A Comparative Study

Platform Presenter: Dr. Kyle Goldstein

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Michaela Nickol (Department of Surgery, University of Saskatchewan), Dr. Johannes van der Merwe (Department of Surgery, University of Saskatchewan).

Rationale:
Total hip arthroplasty (THA) is a widely successful procedure, but the adoption of new femoral stems is often met with hesitation due to concerns regarding a learning curve and potential complications. This study evaluates the impact of introducing a new rectangular femoral stem by comparing radiographic, clinical, and functional outcomes with those of an established metaphyseal loading stem.

Methods:
A retrospective comparative study was conducted between January 2022 and January 2024. Patients were categorized into three groups: (1) control group receiving an established metaphyseal loading stem, (2) "learning curve" group (first half of patients receiving the new rectangular stem), and (3) "experienced" group (second half of patients receiving the rectangular stem). Primary outcomes included femoral stem subsidence and diaphyseal canal filling. Secondary outcomes comprised Oxford Hip Scores (OHS), EQ-5D-5L scores, length of hospital stay, complications, and readmission rates. Statistical analysis utilized ANOVA and chi-square tests, with significance set at $p<0.05$.

Results:
A total of 115 patients (33 control, 41 learning curve, 41 experienced) were included. No significant differences were found in demographics. Subsidence was comparable across groups ($p=0.381$). AP canal filling showed no significant differences ($p=0.839$), but lateral canal filling was greater in the rectangular stem groups ($p<0.001$). Functional outcomes ($p=0.646$), complications ($p=0.318$), and readmission rates ($p=0.402$) were similar across groups. However, hospital stay was significantly shorter in the rectangular stem groups ($p=0.015$).

Conclusion:
The introduction of a new rectangular femoral stem did not result in a significant learning curve affecting subsidence, complications, or functional outcomes. The stem demonstrated improved lateral canal filling and was associated with reduced hospital stay, suggesting a safe transition to this design without compromising early outcomes.

Funding Sources:
None.

Proximity of White Matter Tracts Relative to High Grade Glioma Predicts Clinical Outcome

Platform Presenter: Dr. Jack Su

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Eva Liu (Department of Surgery, University of Saskatchewan), Amy Zhou (Department of Surgery, University of Saskatchewan), Patrick Toyota (Department of Surgery, University of Saskatchewan), Braeden Newton (Department of Surgery, University of Saskatchewan), Nicole Coote (Department of Surgery, University of Saskatchewan), Kristen Marciniuk (Department of Surgery, University of Saskatchewan), Uzair Ahmed (Department of Surgery, University of Saskatchewan), Luke Hnenny (Department of Surgery, University of Saskatchewan), Jonathan Norton (Department of Surgery, University of Saskatchewan), Layla Gould (Department of Surgery, University of Saskatchewan), Amit Persad (Department of Surgery, University of Saskatchewan).

Rationale:
While several studies have demonstrated that glioblastoma exhibits spectral activity concordant with its level of functional integration within the central nervous system, no prior studies have examined proximity of high grade glioma (HGG) to functional white matter tracts (WMT) as it relates to clinical outcome.

Methods:
We identified patients with HGG who underwent diffusion tensor imaging (DTI) at our center from 2016 onward. We collected demographic and outcome data, as well as information on the presence, quantity, and function of WMTs adjacent to the tumor. Regression between WMTs and overall survival (OS) as well as progression-free survival (PFS) were performed.

Results:
A total of 20 patients were identified. The mean age was 54.9 +/- 19.4. Tumor diagnosis included 15 IDH wild-type GBM, 4 IDH mutant astrocytoma and 1 G34 mutant astrocytoma. Ten patients had near-total or gross-total resection. The mean number of tracts near the tumor was 2.32 +/- 1.16, with 15 patients having language-related tracts and 11 patients having motor-related tracts. The most common language and motor related tracts were arcuate fasciculus and corticospinal tract, respectively. Number of tracts making contact with the tumor was negatively correlated with OS ($p=0.04$). Number of motor related tracts in proximity to the tumor was inversely correlated with PFS ($p=0.004$), while number of language-related tracts was correlated with increased PFS ($p=0.03$). Atrophy of nearby tracts was associated with increased PFS ($p=0.016$).

Conclusion:
Location of WMTs relative to HGGs influence patient survival and tumor recurrence. Further research is needed to understand this phenomenon.

Funding Sources:
None.

Quality Improvement Project: Appropriateness of Knee Arthroscopy in Regina, Saskatchewan

Platform Presenter: Dr. Robert Downey

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Jordan Buchko (Department of Surgery, University of Saskatchewan), Mason Beaulieu (College of Medicine, University of Saskatchewan), Aleya Anderson (College of Medicine, University of Saskatchewan), Mark Wang (College of Medicine, University of Saskatchewan), Huzaifa Saeed (College of Medicine, University of Saskatchewan), Dr. Kirat Shukla (Research Department, Saskatchewan Health Authority).

Rationale:
Based on a 2017 position statement from the Arthroscopy Association of Canada, research has shown that knee arthroscopy should not be performed in the majority of patients with degenerative meniscal tears, given non-operative treatment results in equivalent outcomes. Additionally, it has been demonstrated that knee arthroscopy does not provide any benefit over non-operative measures in individuals with knee osteoarthritis lacking mechanical symptoms. This retrospective chart review evaluated the appropriateness of knee arthroscopies performed in Regina, Saskatchewan in 2018 and 2022.

Methods:
A list of all knee arthroscopies performed in 2018 and 2022 was obtained, excluding ligamentous reconstructions and osteotomies. Arthroscopies were classified as "appropriate," "may be appropriate," and "rarely appropriate." Two independent reviewers conducted a subset analysis of the "may be appropriate" group, using the Kellgren-Lawrence scale to evaluate the degree of pre-operative arthritis seen on knee radiographs.

Results:
Of the 1378 charts included in this study, 669 were found to be appropriate (48.5%), 576 were labeled as may be appropriate (41.8%), and 133 were considered to be rarely appropriate (9.7%). In the subset analysis, 157 (27.3%) and 160 (27.8%) additional charts were found to be likely inappropriate by each reviewer, respectively. Weighted Cohen's Kappa demonstrated substantial agreement between the raters ($\kappa w=0.65$). Combined with the initial results, a total of 290 (21.0%) or 293 (21.3%) knee arthroscopies were likely inappropriate.

Conclusion:
Approximately one in five knee arthroscopies were likely inappropriate, the primary reasons being arthroscopy for arthritis alone, degenerative meniscal tears with severe background arthritis, and concomitant steroid injection.

Funding Sources:
Saskatchewan Orthopedic Funding Administration Committee (SORFAC).

Artificial Intelligence in Shared Decision-Making for Knee Osteoarthritis: A Prospective Evaluation of Patient Confidence and Treatment Choices

Platform Presenter: Quinton Ong

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Jans van der Merwe (Department of Surgery, University of Saskatchewan), Dr Mars Zhao (Department of Surgery, University of Saskatchewan), Michaela Nickol (Department of Surgery, University of Saskatchewan).

Rationale:
The integration of artificial intelligence (AI) in clinical decision-making has the potential to enhance patient understanding and confidence in treatment choices. This study evaluates the impact of an AI-based online tool in assisting patients with knee osteoarthritis (OA) in making informed treatment decisions.

Methods:
A total of 109 patients were enrolled; 4 were excluded (3 due to navigation difficulties and 1 due to time constraints), leaving 105 patients. All patients underwent clinical and radiographic assessment, followed by a final diagnosis and a treatment plan involving either non-operative management or surgery. Participants were invited to use an AI based decision-support tool, and their time to complete the program was recorded. Upon completion, results were documented, and patients completed a questionnaire assessing the AI tool's usefulness and ease of use.

Results:
The AI tool altered the treatment decision in 10.6% of patients. Most participants found the AI system beneficial, with 83.8% rating it as helpful and 96.1% reporting ease of navigation. Additionally, 83.4% of patients experienced greater peace of mind regarding their decision, and 90% would recommend the AI tool. The mean time to complete the AI program was 17.5 minutes (range: 6–36 minutes, SD: 6.65). Statistically significant correlations were found between the severity of OA and the likelihood of surgical booking ($p=0.0121$, OR=3.57), BMI and surgery booking ($p=0.0036$, OR=1.28), and patient's age and surgical booking ($p=0.022$). There was no significant association between AI recommendations and patients' final treatment decisions. However, lower predicted improvement in pain by AI was significantly associated with a contradiction in the patient's decision ($p=0.031$, OR=1.03). Older patients took longer to complete the AI program ($p=0.00041$). Increased age correlated with a lower predicted risk of mortality ($p=0.0001$) but a higher risk of complications ($p=0.003$). Higher BMI was associated with a lower predicted complication risk ($p=0.002$). Higher Oxford scores correlated with a lower likelihood of surgery ($p=0.011$, OR=1.09), while higher KOOS scores increased surgical likelihood ($p=0.044$, OR=0.89).

Conclusion:
The AI-based decision tool was well-received, providing reassurance and guidance for patients. However, its influence on actual treatment decisions was limited. Factors such as OA severity, BMI, and age significantly impacted surgical decisions, whereas AI predictions did not alter final choices. Further refinement of AI algorithms may enhance their predictive value and impact on decision-making.

Funding Sources:
None.

Preventing Cancer Through Métis Cultural Revitalization: A Framework for Saskatchewan

Platform Presenter: Dr. Gary Groot | Maria Diaz

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Tracey Carr (Community Health and Epidemiology, University of Saskatchewan), Calvin Racette (Métis Nation-Saskatchewan), Maria Diaz (Department of Surgery, University of Saskatchewan), Knowledge Keeper Calvin Racette (Métis Nation-Saskatchewan), Knowledge Keeper Joan Pelletier (Métis Nation-Saskatchewan), Elizabeth Cooper (University of Regina), Dr. Jennifer Sedgewick (York University), Tara Turner (First Nations University of Canada), Tegan Brook (Métis Nation-Saskatchewan), Marg Friesen (Métis Nation-Saskatchewan), Tanya Pruden (Métis Nation-Saskatchewan), Allyson Stevenson (Indigenous Studies, University of Saskatchewan), Marlin Legare (Department of Surgery, University of Saskatchewan) Darlene Rude (Saskatchewan Cancer Agency), Margot Gough (Saskatchewan Cancer Agency).

Rationale:
The Canadian Métis population experiences higher cancer rates, leading to reduced life expectancy. Culture is vital to Indigenous health, offering belonging and improving well-being. This community-based study aimed to create a Métis Cultural Continuity Framework for cancer prevention that can be adapted for use in other Métis communities.

Methods:
Participants were recruited from seven MN-S cultural events held between June 2022 and March 2023, where researchers were engaged in Métis cultural activities (e.g., beading, hide tanning). Semi-structured telephone interviews with 24 MN-S citizens (12 men, 12 women) were analyzed using the Collective Consensual Data Analytic Procedure (CCDAP), enabling the diverse Research Advisory Committee members to identify key themes.

Results:
Key themes included colonization and its impacts, community, cultural revitalization, strength, and pride. Participants highlighted the profound effects of colonization on their lives and communities while celebrating the resilience and solidarity that define the Métis community. These themes were used to develop a Métis Cultural Revitalization Framework for Cancer Prevention , rooted in the symbolism of the Red River Cart, which is a significant cultural emblem for the Métis people. Each theme was conceptualized as a spoke of the cartwheel, playing a vital role in ensuring both stability and progress for the cart and the Métis community.

Conclusion:
For the Métis community, strong cultural connections are essential for fostering a sense of belonging, reducing risk behaviors , and promoting both mental and physical well-being. These factors are vital for achieving a healthy lifestyle and can contribute to health promotion.

Funding Sources:
The Canadian Institutes of Health Research, the Saskatchewan Health Research Foundation, and the Canadian Cancer Agency.

Serological Risk Factors Associated with Arthroplasty Complications

Platform Presenter: Dr. Mars Zhao

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Cole Elaschuk (College of Medicine, University of Saskatchewan), Janan Ashique (College of Medicine, University of Saskatchewan), Mikayla Rudniski (College of Medicine, University of Saskatchewan), Jenna England (College of Medicine, University of Saskatchewan), Nathan Oster (College of Medicine, University of Saskatchewan), Mason Beaulieu (College of Medicine, University of Saskatchewan), Davidson Fadare (College of Medicine, University of Saskatchewan).

Rationale:
Post-operative complications can have a devastating impact on patients' quality of life. Peri-operative bloodwork is often routinely conducted and may predict post-operative complications. The purpose of this study is to understand if pre- or post-operative serology is associated with post-operative complications arising from hip and knee arthroplasty.

Methods:
A retrospective chart review of 383 participants with post-operative total hip and knee arthroplasty complications was conducted. One hundred and forty participants with post-operative complications were included and compared to a control group of 120 participants. Patient, surgical, and pre- and post-operative serological data were collected. L2-regularized logistic regression was utilized to assess whether identified factors independently predicted post-operative complications.

Results:
The complications group had higher age, male sex, presence of osteoporosis, Charlson Comorbidity Index and bilateral arthroplasties compared to the control group ($p<0.05$). Pre-operatively, the complications group had a lower hemoglobin value ($p=0.027$; OR=0.64) and higher Basophil Count ($p=0.012$, OR=2.23) and Monocyte–Lymphocyte ratio ($p=0.003$, OR=2.23), higher rates of undergoing a general anesthetic ($p=0.019$, OR=0.43) and psychiatric illness ($p=0.001$, OR=3.07). Post-operatively, the complications group had lower WBC ($p=0.040$, OR=0.55) and Neutrophil counts ($p=0.001$, OR=0.45), increased Eosinophil count ($p=0.018$, OR=2.36), increased age ($p=0.034$, OR=2.06) and BMI ($p=0.049$, OR=1.74), having postoperative anticoagulation other than ASA ($p=0.000$, OR=3.99).

Conclusion:
We identified multiple peri-operative patient, surgical, and serological risk factors for developing post-operative complications following hip and knee arthroplasty. These markers could be prioritized for monitoring high-risk patients for possible intervention.

Funding Sources:
None.

Dexamethasone Does Not Increase Efficacy of Laparoscopic TAP Blocks in Colorectal Surgery

Platform Presenter: Dr. Nathan Ginther

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Dilip Gill (Department of Surgery, University of Saskatchewan), Dr. Haven Roy (Department of Surgery, University of Saskatchewan), Dr. Zarrukh Baig (Department of Surgery, University of Saskatchewan), Dr. Samantha Bird (Department of Surgery, University of Saskatchewan), Dr. Nawaf Abu-Omar (Department of Surgery, University of Saskatchewan).

Rationale:
Despite advances in perioperative analgesia, up to 70% of patients undergoing laparoscopic surgery report moderate to severe pain. Transversus-abdominis plane (TAP) blocks with local anesthetic reduce postoperative pain, and adjuncts such as dexamethasone may potentiate the analgesic effect.

Methods:
Multi-centre, single-blinded, randomized controlled trial involving 61 participants. The treatment group had TAP blocks with 1cc/kg 0.25% bupivacaine + 16mg dexamethasone; the control group had TAP blocks with bupivacaine alone. A standardized anesthetic protocol was used to minimize confounders. Outcomes included total opioid usage in PACU, opioid usage at 24 and 48 hrs, length of stay, and postoperative nausea and vomiting. Study sites included Royal University Hospital, Saskatoon, SK, and St. Paul's Hospital, Vancouver, BC.

Results:
61 patients were enrolled; 33 had TAP-DEX treatment and 28 had TAP alone. On univariate and multivariate analyses, no significant difference was observed in opioid consumption or length of stay. There was no difference in postoperative nausea and vomiting nor any major complications.

Conclusion:
TAP blocks with dexamethasone do not appear to improve potency or duration of analgesia over bupivacaine alone.

Funding Sources:
Department of Surgery New Faculty Seed Funding.

Very Long-Term Outcomes of Single-Level Minimally Invasive Tubular Lumbar Microdiscectomy with > 10 Years Follow-up

Platform Presenter: Dr. Eva Liu

Division of Neurosurgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Amit Persad, (Department of Surgery, University of Saskatchewan), Michael Kindrachuk (Department of Surgery, University of Alberta), Eric Noyes (Department of Medicine, University of Saskatchewan), Dr. Daryl Fourney (Department of Surgery, University of Saskatchewan).

Rationale:
Minimally invasive tubular microdiscectomy is an effective treatment for lumbar radiculopathy. This study examines long-term outcomes of tubular microdiscectomy in patients with >10 years of follow-up.

Methods:
Consecutive patients who underwent tubular microdiscectomy for lumbar radiculopathy from May 1, 2010, to July 31, 2013 by a single surgeon at our institution were retrospectively reviewed. We measured VAS leg, VAS back, Oswestry Disability Index (ODI), EQ-5D-3L and EQ-VAS scores as well as achievement of minimal clinically important difference (MCID).

Results:
103 consecutive patients were included, with a mean age of 52.0 ± 14.9 years, and 52 (50.5%) were female. Patients were assessed at baseline, short-term (6 weeks), long-term (3.8 ± 1.2 years), and very long-term (11.6 ± 1.4 years) follow-up. All outcome measures significantly improved after surgery and continued to improve over time with longer follow-up. More patients met the MCID for EQ-5D, EQ-VAS or any outcome measure at longer-term follow-up. A total of 6 patients (5.8%) had incidental durotomy, and a total of 9 patients (8.7%) needed reoperation. Multivariate analysis shows Worker's Compensation Board (WCB) status was an independent predictor for length of stay on initial admission and poor ODI at 6-weeks. BMI>30 was an independent predictor for not achieving MCID for VAS leg at very long-term follow-up and increased need for reoperation.

Conclusion:
We report sustained improvement after tubular microdiscectomy with > 10 years follow-up. WCB status and BMI >30 were associated with worse outcome at short and long-term follow-up respectively.

Funding Sources:
None.

The Impacts of a Night Float Call System Within an Orthopedic Residency Program: A Prospective Analysis on Resident Wellness, Satisfaction, and Education

Platform Presenter: Dr. Zach Oleynik

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Liz Quon (Department of Surgery, University of Saskatchewan), Dr. Mars Zhao (Department of Surgery, University of Saskatchewan), Dr. David Sauder (Department of Surgery, University of Saskatchewan).

Rationale:
Our orthopedic program has historically utilized a 24-hour call system to cover the trauma service. Resident wellness and quality of life is largely impacted by work hours and call burden. As of July 2023, our program transitioned from traditional 24-hour call to a night float system. The purpose of this study was to analyze the impacts of a night float on resident wellness, satisfaction, and education.

Methods:
Prospective data collection was collected from orthopedic residents at the end of every four-week rotation for one year. These surveys assessed health status (SF-36 scores), educational outcomes, and resident satisfaction. At the end of the year a semi-structured interview was conducted. Cohorts included night float residents, non-night float residents, and traditional 24 hour call residents.

Results:
A total of 92 submissions were collected across 16 academic blocks. Three study groups included orthopedic rotation resident (N=63), night float (N=11), and traditional 24-hour call resident (N=18). Across the three cohorts there were no significant differences in health-related outcomes (SF-36 scores). Orthopedic rotation residents strongly agreed (78.7%) and agreed (13.1%) that their educational experience was improved by having a night float system in place. Educational outcomes showed no significant differences in study time or teaching rounds attendance ($p>0.05$). Junior residents were previously taking approximately 55 post call days per year. With the night float system junior residents missed less than five days each due to post call requirements. This equated to a net benefit of over 50 working days for junior residents.

Conclusion:
A night float system is a reasonable alternative to the traditional 24-hour call system for an orthopedic program.

Funding Sources:
None.

Is the Palliation of Pancreatic Cancer Patients Too Passive? A National Survey of Canadian Physicians

Platform Presenter: Dr. Ali AlQatan | Dr. Helen Liang

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Shahid Ahmed (Saskatoon Cancer Agency), Dr. James Macmillan (Saskatoon Cancer Agency), Dr. Chad Ball (Department of Surgery, University of Calgary), Dr. John Matic (Student Wellness, University of Saskatchewan), Dr. Michael A. J. Moser (Department of Surgery, University of Saskatchewan).

Rationale:
Historically, the care of patients with unresectable pancreatic cancer has been shaped by nihilism, with an acceptance of poor outcomes rather than an emphasis on active palliation. Advances in chemotherapy, pain control, and nutrition over the last 15 years can significantly improve both quality and quantity of life. This study assessed how Canadian physicians approach the palliation of pancreatic cancer in the mid-2020s.

Methods:
A national online survey was distributed to medical oncologists, surgeons, family physicians, and palliative care specialists across Canada. It included direct questions about referral timing, treatment choices, and symptom management, as well as patient scenarios assessing real-world decision-making.

Results:
A total of 113 physicians completed the full survey. While 80% supported early palliative care involvement, only 26% reported that more than half of their patients were referred early. Celiac plexus intervention was available to 66%, yet 32.7% referred only after multiple failed opioids, and 52% waited for outright failure of analgesia. Palliative chemotherapy was offered at diagnosis in 96% of cases, yet only 4% believed it provided significant survival benefit, while 28.3% considered its impact minimal. Pancreatic enzyme replacement therapy (PERT) was started proactively by only 24%, while 61% waited for symptoms and 22% required weight loss before initiation. Additionally, 41% did not routinely screen for depression or anxiety.

Conclusion:
The palliation of pancreatic cancer remains inconsistent, with delays in pain management, mixed perceptions of chemotherapy benefit, and underuse of nutritional and psychosocial support. Education and standardized pathways are needed to improve care for patients with advanced pancreatic cancer.

Funding Sources:
APEF funding, University of Saskatchewan College of Medicine.

Cost Improvement and Environmental Protection Related to Outpatient Department of Surgery vs. Operating Room Surgery

Platform Presenter: Sabahat Saeed

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. David Sauder (Department of Surgery, University of Saskatchewan).

Rationale:
Climate change poses a significant public health threat, and the healthcare sector must contribute to reducing greenhouse gas emissions. Operating rooms (ORs) are highly energy-intensive and produce substantial waste, including disposable products and anesthetic gases. This study compare the environmental impact and cost-effectiveness of simple operative procedures (SOPs) like carpal tunnel releases, ganglionectomies, and trigger finger releases performed in outpatient departments (OPDs) versus ORs, hypothesizing that OPDs are more sustainable and cost-effective.

Methods:
This observational study was conducted at an ambulatory care center in Saskatchewan. A total of three OR and six OPD procedures performed by a single surgeon were observed. Data on procedural duration, resource utilization, waste generation, and associated costs were systematically collected. Carbon emissions were estimated based on the processing of clinical waste and linens, as well as energy consumption from room lights, surgical lights, and central processing. Costs were categorized into direct and indirect expenses.

Results:
A single outpatient procedure produced 0.938 $kgCO_2e$, while an OR procedure produced 3.488 $kgCO_2e$. OR procedures generated 18 times more surgical waste and used twice as much linens. Financially, an outpatient procedure cost $376.78, while an OR procedure cost $927.75.

Conclusion:
Shifting SOPs from ORs to OPDs can significantly reduce environmental impact and costs. OPD procedures generated 73.1% less carbon emissions and 94.5% less surgical waste, and were 59% less expensive. These findings suggest that outpatient settings offer a more sustainable and cost effective alternative for many simple procedures, contributing to a greener and more economically efficient healthcare system.

Funding Sources:
Dean's Summer Research Project .

2025
Department of Surgery
RESEARCH DAY
POSTER SESSION **ABSTRACTS**

Quantitative Analysis of Transoral Orthodromic Temporalis Tendon Transfer

Poster Presenter: Ayeh Aldulaymi

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Rick Jaggi (Department of Surgery, University of Saskatchewan), Dr. Abdulmalik Ismail (King Saud Bin Abdulaziz University), Dr. Le Ha (Department of Community Health & Epidemiology, University of Saskatchewan), Dr. Prosanta Mondal (Department of Community Health & Epidemiology, University of Saskatchewan).

Rationale:
Chronic facial paralysis leads to facial asymmetry and diminished emotional expressiveness, significantly impacting quality of life. Transoral orthodromic temporalis tendon transfer (TOTTT) is a surgical technique used to restore dynamic facial movement in patients with long-standing paralysis.

Methods:
A systematic review and meta-analysis were conducted and were reported according to PRISMA 2020 guidelines. MEDLINE, Embase, Cochrane Library, and ClinicalTrials.gov were searched for studies reporting pre- and post-operative outcomes following TOTTT. Primary outcomes included changes in smile angle, upper lip height deviation, and commissure excursion. Pooled means were calculated using random effects models. Heterogeneity was assessed using I^2 statistics and publication bias with funnel plots.

Results:
Nine studies including 186 patients were included. TOTTT resulted in a significant mean improvement in commissure excursion (10.36 mm) and upper lip height deviation (4.51 mm). House-Brackmann facial nerve grading improved from a mean score of 5.1 pre-operatively to 3.5 post-operatively ($p<0.001$). Although improvements in smile angle were directionally positive, results were not statistically significant due to high heterogeneity ($I^2 > 99\%$). Other outcomes demonstrated low heterogeneity ($I^2 = 0\%$).

Conclusion:
TOTTT offers quantifiable improvements in facial symmetry and facial nerve function in patients with chronic facial paralysis. These findings support its role as an effective surgical option for dynamic facial reanimation, though further high-quality studies are needed to standardize outcome reporting and reduce heterogeneity.

Funding Sources:
None.

The Utility of a Community-Based Knee Ultrasound in Detecting Meniscal Tears: A Retrospective Analysis in Comparison with MRI

Poster Presenter: Fatima Awan

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Prosanta Mondal (Department of Community Health & Epidemiology, University of Saskatchewan), Dr. Johannes M. van der Merwe (Department of Surgery, University of Saskatchewan), Dr. Nicholas Vassos (Department of Medical Imaging, University of Saskatchewan), Dr. Haron Obaid (Department of Medical Imaging, University of Saskatchewan).

Rationale:
MRI is the gold standard for detecting meniscal tears; however, ultrasound may readily detect meniscal changes, obviating the need for MRI. We aim to (1) determine ultrasound sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy in detecting meniscal changes, and (2) describe characteristic meniscal changes in US and their prevalence.

Methods:
A retrospective analysis of knee ultrasound scans for the presence of medial and lateral meniscal tears was conducted. Meniscal changes were characterized into five US appearances (cleft, diminutive, cyst, displaced fragment, and extrusion) by consensus of two musculoskeletal radiologists. Ultrasound findings were compared to MRI results.

Results:
In total, 249 patients were included. Ultrasound sensitivity, specificity, PPV, NPV, and accuracy for medial meniscal tears were 79%, 97.3%, 95.3%, 86.6%, and 90%, respectively. For lateral meniscal tears, sensitivity, specificity, PPV, NPV, and accuracy were 63%, 99.5%, 96%, 93%, and 93.6%. The false negative and false positive rates for medial meniscal tears were 13.4% and 4.7%, respectively, and for lateral meniscal tears, 6.7% and 3.8%. Meniscal clefts were the most prevalent in the medial meniscus, followed by extrusions. Meniscal extrusions were the most prevalent in the lateral meniscus, followed by clefts.

Conclusion:
Community-based US is highly accurate in detecting meniscal tears compared with MRI, making it a valuable diagnostic tool in settings where MRI is limited or where there are MRI contraindications.

Funding Sources:
None.

Tolosa Hunt Syndrome Masquerading as Orbital Complication of Sinusitis: A Case Report

Poster Presenter: Sonya Mannala

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Rick Jaggi (Department of Surgery, University of Saskatchewan), Fahad Alobaid (Department of Surgery, University of Saskatchewan).

Rationale:
Tolosa-Hunt syndrome (THS) is a rare inflammatory disorder characterized by severe unilateral periorbital headache, painful eye movements, and ophthalmoplegia. Diagnosis relies on clinical presentation, neuroimaging, and response to steroids. Due to its rarity and nonspecific initial presentation, THS is often misdiagnosed, leading to delays in appropriate treatment.

Methods:
We describe the case of a young woman who presented with binocular diplopia, proptosis, and worsening ophthalmalgia. Initial workup, including a head CT, revealed incidental pan-sinusitis, leading to a preliminary diagnosis of sinusitis-related orbital complications. She was treated with systemic and nasal steroids, followed by endoscopic sinus surgery. However, her symptoms recurred within a short period, prompting further evaluation.

Results:
Comprehensive laboratory and imaging studies ruled out alternative causes, and an orbital MRI revealed subtle enhancement of the right orbital apex with extension into the right cavernous sinus, raising suspicion for THS. A trial of oral steroids led to complete symptom resolution, supporting the diagnosis.

Conclusion:
THS is a diagnosis of exclusion that requires careful evaluation to differentiate it from other orbital and neurological conditions. This case underscores the importance of considering THS in patients with recurrent orbital pain and ophthalmoplegia to ensure timely and appropriate management.

Funding Sources:
None.

An Analysis of the Seasonal Impact on Periprosthetic Joint Infections

Poster Presenter: Evan Parchomchuk

Undergraduate Medical Student
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Mars Zhao (Department of Surgery, University of Saskatchewan), Thomas Goldade (College of Medicine, University of Saskatchewan), Mikayla Rudniski (College of Medicine, University of Saskatchewan), Nathan Oster (College of Medicine, University of Saskatchewan), Mason Beaulieu (College of Medicine, University of Saskatchewan).

Rationale:
Periprosthetic joint infection (PJI) is a major complication of joint arthroplasty, contributing to significant patient morbidity and healthcare costs. PJIs occur in 1-2% of cases, being the leading cause of revision surgery. Understanding risk factors, including seasonal impact on PJI rates, is essential to develop prevention strategies. Prior studies on the seasonal influence have yielded mixed results, with European studies linking warmer seasons to increased PJI rates, while North American data are less conclusive.

Methods:
Following Research Ethics Board approval, a single-center retrospective review was conducted on patients with PJIs at a tertiary center from April 2012 to May 2024. Eligible cases were diagnosed using MSIS and EBJIS criteria. A total of 114 cases of PJI were analyzed after exclusions. Data collection included demographic, comorbidity, and surgical details such as season of surgery, comorbidities, anesthesia type, and perioperative antibiotic use.

Results:
Among 114 patients with PJIs, acute PJIs were more common in winter (28%) and summer (26%), though findings were not statistically significant. Late PJIs had higher prevalence in winter and fall (31%). THA patients were more likely to experience acute PJI, whereas late PJI was more common in TKA patients.

Conclusion:
No significant seasonal influence on PJI incidence was observed. However, an association between surgeon variability and PJI rates was identified. Future studies with larger samples are needed to clarify the seasonal impact and further investigate individual surgical practices to optimize outcomes.

Funding Sources:
None.

Global Training Program in Orthopedic Trauma Surgery - Results from Year 1

Poster Presenter: Dr. Colleen Nesbitt

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Peterly Philippe (Hopital Universitaire de Mirebalais), Dr. Hue Rees (Department of Surgery, University of Saskatchewan), Dr. Scott Willms (Department of Surgery, University of Saskatchewan).

Rationale:
Providing advanced orthopedic training to surgeons from low- and middle-income countries (LMICs) can strengthen surgical care in these nations. Historically, LMIC surgeons have had limited access to advanced training opportunities. To address this disparity, a post-graduate training program was launched at a Canadian Level One teaching hospital with a well-established orthopedic residency.

This study evaluates the program's inaugural year. The primary objective of this study was to assess the program's impact on the LMIC trainee's surgical knowledge and operating confidence, and to identify barriers encountered. The secondary aim was to evaluate integration into the existing resident educational framework.

Methods:
A surgical log and surveys were collected from the LMIC trainee at intervals during the training program. Staff and resident's completed feedback surveys at the program's conclusion.

Results:
The program hosted an orthopedic surgeon from Haiti, who participated in 614 surgeries across nine specialties. Challenges included adapting to a new healthcare system, high living costs, and cultural differences. Despite these, the trainee felt supported by staff and residents. Exposure to advanced procedures, equipment, and techniques improved his efficiency, and he concluded the program feeling 'very confident' in his surgical skills. Staff and residents reported positive experiences, noting enhanced understanding of surgery in resource-limited settings.

Conclusion:
This pioneering program successfully integrated a LMIC surgeon into a surgical residency program. The trainee gained surgical skills and techniques applicable to his home country. Staff and residents benefited from enhanced understanding of surgery in low-resource settings. The outcomes suggest that such initiatives can enhance global surgical training.

Funding Sources:
Team Broken Earth.

The Development of a Novel Organoid Model of the Gut-Brain Axis in Inflammatory Bowel Disease

Poster Presenter: Dr. Amanda Hall

Division of General Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Tyler Wenzel (Department of Neurophysiology, University of Saskatchewan), Dr. Sharyle Fowler (Department of Gastroenterology, University of Saskatchewan), Farinaz Ketabat (Department of Surgery, University of Saskatchewan), Fiza Noor (College of Medicine, University of Saskatchewan).

Rationale:
Individuals with Inflammatory bowel disease (IBD), are twice as likely as the general population to also be diagnosed with anxiety or depression. The link between IBD (including Crohn's Disease and Ulcerative Colitis) and mental health disorders is poorly understood, but a shared inflammatory pathophysiology may link the disease processes. Our goal is to create the first human-based in-vitro model of the gut-brain axis in IBD. Our model will be comprised of organoids; 3-D multi-cellular structures that retain the functioning of their original source organ and are derived from stem cells.

Methods:
We are recruiting healthy patients and those with Crohn's Disease, or Ulcerative Colitis. Colonoscopic biopsies will be used to grow intestinal organoids and progenitor cells from blood samples will be used to grow brain organoids. We will validate our model, and then quantify the inflammatory factors produced by the diseased intestinal organoids, using a variety of methods. We will co-culture the brain and intestinal organoids and observe for changes in the brain organoids when exposed to the inflammatory factors produced by the intestine. Changes in brain organoids will be evaluated based on both morphology and cytokine production.

Results/Conclusion:
We are currently recruiting participants for this study. We hope that our results will show that inflammatory factors originating in the intestine cause changes in the brain in the setting of IBD.

Funding Sources:
Saskatchewan Health Research Foundation, Women Leading Philanthropy.

EOS® Biplanar Imaging vs. X-ray for Accurate Measurements of Common Foot and Ankle Parameters

Poster Presenter: Dr. Paul Kulyk

Division of Orthopedic Surgery, Department of Surgery
College of Medicine, University of Saskatchewan

Team Members/Affiliations:
Dr. Liz Quon (Department of Surgery, University of Saskatchewan), Dr. Haron Obaid (Department of Medicine, University of Saskatchewan), Dr. David Leswick (Department of Medical Imaging, University of Saskatchewan), Dr. Michael Barnett (Department of Medicine, University of Saskatchewan).

Rationale:
EOS® is an imaging system that captures simultaneous AP and lateral images in an orthogonal plane, enabling 3D reconstruction using population-based calculations. This study aimed to validate a novel foot position within the EOS scanner to measure common weight-bearing foot and ankle parameters. If successful, this approach could serve as a precursor to developing a 3D reconstruction technique for EOS-based surgical planning.

Methods:
Ten volunteers with normal foot morphology underwent weight-bearing EOS imaging in a novel foot position (feet rotated at right angles) and standard weight-bearing foot and ankle imaging. Two musculoskeletal radiologists, blinded to patient information, independently measured nine parameters from both imaging modalities. Statistical analysis was performed by the Clinical Research Support Unit using Lin's concordance correlation coefficient.

Results:
Results showed poor agreement between EOS and traditional imaging for all parameters. Inter-observer agreement was also poor but was higher than the agreement between the two imaging modalities.

Conclusion:
Biomechanical changes induced by foot positioning may have exaggerated deformities, affecting measurement consistency. Given these findings, EOS is unlikely to be a viable substitute for weight bearing CT in foot and ankle assessment.

Funding Sources:
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Notes

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