UNIVERSITY OF MANITOBA

UNIVERSITY OF SASKATCHEWAN

RESEARCH DAY

OCTOBER • 18 • 2024

PAN AM CLINIC

DR. LAURIE HIEMSTRA M.D., PhD

Dr. Hiemstra is a Fellowship trained orthopaedic surgeon working in Banff, Canada. She holds Clinical Professor appointment at the University of Calgary. The clinical and research program in Banff is focused on knee ligament injury, prevention of secondary injury, rehabilitation and surgical outcomes with an emphasis on ACL injury and reconstruction and patellofemoral instability. Laurie is on the Board of Directors of the Patellofemoral Foundation, Banff Sport Medicine Foundation, and the International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine (ISAKOS). Laurie has published over 80 peer-reviewed papers and is a national and international speaker.

Laurie obtained her Medical Degree from the Memorial University of Newfoundland, completed an orthopaedic residency at the University of Manitoba, and a Clinical Fellowship in Orthopedic Sport Medicine at the University of Western Ontario. She also attained a PhD in Neuromuscular Physiology. Laurie has worked as an Orthopaedic Surgeon at Banff Sport Medicine since 2005. Her clinical focus is on patellofemoral instability and ACL reconstruction.

Laurie is the Past-President of the Canadian Orthopaedic Association (2022-2023). She is also an active member of many sport medicine organizations, including the Arthroscopy Association of Canada (AAC), International Society of Arthroscopy, Knee and Orthopedic Sports Medicine (ISAKOS), European Society for Sport Traumatology, Knee Surgery and Arthroscopy (ESSKA) Arthroscopy Association of North America (AANA), the American Orthopedic Society of Sports Medicine (AOSSM), and the International Patellofemoral Study Group.

Dr. Hiemstra has a keen interest in gender diversity and inclusion in orthopaedic surgery. She is a founding member of the International Orthopaedic Diversity Alliance (IODA) and Women in Orthopaedics Worldwide (WOW). She is the 2ndPresident-Elect for IODA and the past chair of the Gender Diversity and Inclusion Task Force for both the COA and for ISAKOS.

University of Manitoba | Rady Faculty of Health Sciences

Dr. Bradley Pilkey
Section Head

Dr. Ted Tufescu
Residency Program Director

Dr. Dan Ogborn
Research Director

Dr. Eric Bohm
Orthopedic Surgeon

Monther Abuhantash, PGY5

Riley Hemstock, PGY5

Melinda Fowler-Woods, PGY5

Rohit Bansal, PGY4

Madison Price, PGY4

Andrew Fast, PGY3

Jaskaran Singh, PGY2

Darren Van Essen, PGY2

Tess Bracken, PGY1

Soroush Nedaie, PGY1

Josh Garofalo, PGY1

University of Saskatchewan

Dr. Andrew Urmson
Residency Program Director

Dr. Laura Sims
Research Director

Dr. David Sauder
Orthopedic Surgeon

Dr. Kristi Billard
Orthopedic Surgeon

Liz Quon, PGY5

Kyle Goldstein, PGY3

Alex Le, PGY3

Zach Oleynik, PGY3

Omer Alkhateeb, PGY2

Colleen Nesbitt, PGY2

Mars Zhao, PGY2

Abdulwahab Aladsani, PGY1

Robert Downey, PGY1

Gavin King, PGY1

PROGRAM

SESSION I: Dr. Eric Bohm, Moderator

Time	Title	Presenter
9:30	Welcome & Introduction	Dr. Ted Tufescu
9:40	Quality Improvement Project: Appropriateness of Knee Arthroscopy in Regina, SK	Dr. Robert Downey
9:50	Incidence and Pattern of Metaphyseal Debonding Cementless Design Stem in Different Bearing Types: A Case-Control Case Series Study	Dr. Rohit Bansal
10:00	Causative Factors Associated with Various Subsidence of the Tibial Component in Primary Total Knee Arthroplasty	Dr. Mars Zhao
10:10	Are Outcomes of a First Total Joint Arthroplasty Associated with Outcomes of Subsequent Total Joint Arthroplasty of a Different Joint?	Dr. Soroush Nedaie
10:20	Assessing the Learning Curve While Incorporating a New Femoral Stem in Total Hip Arthroplasty: A Non-Randomized Control Trial	Dr. Kyle Goldstein
10:30	Reducing Anemia in High Risk Hip Fractures: A QI Project	Dr. Alex Le
10:40	**HEALTH BREAK**	

SESSION II: Dr. David Sauder, Moderator

Time	Title	Presenter
10:50	Management of Severe Trochlear Dysplasia and Recurrent Patellofemoral Instability	Dr. Laurie Hiemstra
11:20	Investigating Pediatric Musculoskeletal and Head Injuries During the COVID-19 Pandemic in Manitoba	Dr. Monther Abuhantash
11:30	Improving Postoperative Pain Management in Pediatric Orthopedic Surgery: A Quality Improvement Initiative Using Patient and Parent Education	Dr. Darren Van Essen
11:40	Osteochondritis Dissecans Lesions of the Femoral Trochlea: A Case Report and Systematic Review	Dr. Riley Hemstock

11:50	Comparative Diagnostic Value of Serological and Synovial Tests for Periprosthetic Joint Infection: A Comprehensive Analysis	Dr. Mars Zhao
12:00	Powdered Intrawound Vancomycin in Open Fractures: A Randomized Controlled Trial (PIVOT)	Dr. Madison Price
12:10	Evaluation of a Global training Program in Orthopedic Surgery	Dr. Colleen Nesbitt
12:20	**LUNCH**	

SESSION III: Dr. Laura Sims, Moderator

13:20	Telling the Full Story – Moving Towards More Comprehensive Research with and for Indigenous People in the Orthopedic Surgery	Dr. Melinda Fowler-Woods
13:30	Canadian Prospective Pragmatic Perilunate Outcomes Trial (C3PO)	Dr. Omer Alkhateeb
13:40	Non-Operative Costs Associated with Management of Thumb Basal Joint Arthritis	Dr. Jaskaran Singh
13:50	The Impacts of a Night Float Call System within an Orthopedic Residency Program: A Prospective Analysis on Resident Wellness, Satisfaction, and Education	Dr. Zach Oleynik
14:00	The Effect of Looped Suture Orientation on the Biomechanical Properties of Tendon/Ligament Graft Reconstruction? An in Vitro Porcine Model Biomechanical Study	Dr. Andrew Fast
14:10	Surgeons' Prediction of Patients' Postoperative 1-year SANE Score Following Rotator Cuff Repair Surgery	Dr. Monther Abuhantash
14:20	**HEALTH BREAK**	
14:30	Tour	Dr. Dan Ogborn
15:00	Supporting Diversity and Inclusion: Exploring the Effectiveness and Sustainability of Gender Diversity Initiatives	Dr. Laurie Hiemstra
15:30	Conclusion	Dr. Ted Tufescu

EVENING PROGRAM:

Dinner & Awards at 6:00 PM
Manitoba Club
194 Broadway

Dr. Robert Downey
PGY1 – Orthopaedic Surgery
University of Saskatchewan

Supervisor: Mason Beaulieu BSc., Aleya Anderson BSc., Mark Wang BSc., Huzaifa Saeed BSc., Kirat Shukla PhD., Jordan Buchko MD, FRCSC

QUALITY IMPROVEMENT PROJECT: APPRORIATENESS OF KNEE ARTHROSCOPY IN REGINA, SK

Background: 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. Given the finite availability of operating room time and the risks associated with surgery, ensuring that patients undergo knee arthroscopy appropriately is critical for safe, timely, and cost-effective care. 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 from health information services, 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, evaluating pre-operative knee radiographs and classifying hem as "likely appropriate" or "likely inappropriate" based on the degree of arthritis present.

Results: Of the1378 charts included in this study,726 were found to be appropriate (52.7%),519 were labeled as may be appropriate (37.7%), and 133 were considered to be rarely appropriate (9.7%). In the subset analysis,142 (27.4%) and 146 (28.1%) charts were found to be likely inappropriate by each reviewer, respectively. Weighted Cohen's Kappa demonstrated strong agreement between the raters ($\kappa = .626$).

Conclusions: Approximately 1 in 5 knee arthroscopies in Regina were likely inappropriate. The primary reasons being arthroscopy for arthritis alone, degenerative meniscal tears with severe background arthritis, and concomitant steroid injection. The results of this study will be used to educate surgeons in Regina regarding surgical best practice and health resource stewardship.

Dr. Rohit Bansal
PGY4 - Orthopaedic Surgery
University of Manitoba

Supervisor: Drs. C. Righolt, T. Gascoyne, D. Burnell, E. Bohm, T. Turgeon

INCIDENCE AND PATTERN OF METAPHYSEAL DEBONDING IN CEMENTLESS DESIGN STEM IN DIFFERENT BEARING TYPES: A CASE-CONTROL CASE SERIES STUDY

Background: Loss of Hydroxyapatite (HA)coating was noted during revision total hip arthroplasty (THA) in patients with a primary THA using a specific HA-coated stem (Corail, DePuy-Synthes). There was associated progressive radiographic implants loosening. The purpose of this study was to identify potential causes and associated risk factors for HA stem loosening.

Methods: We screened all revision THA patients with primary Corail stems, revised between 2006 and 2021. Patients with delaminated stems were included as 'cases' and were compared to those with revision THA for other reasons as 'controls. The demographic data, patient-reported outcome measures (PROMs), implant design characteristics, and perioperative information for both cases and controls were collected. Stem radiolucency was assessed using Gruen's classification. Additionally, a thorough implant retrieval analysis was conducted on the stems.

Results: Out of 3,758 patients with Corail stems, 27 were revised for loosening and 91for other indications. There was equal gender distribution, with similar median weight and BMI amongst the groups. No difference in laterality was noted. There was a higher population of younger and taller patients in the loosening group(cases). Also, a higher proportion of smaller and collarless stems was noted in the loosening group(cases). Metal on metal and Pinnacle Porocoat Cup also failed frequently in the loosening group. Hazard ratio (95% confidence interval) of the association between certain patient and implant characteristics and mid-term revision for a septic loosening exhibited higher hazard ratio for patients who were younger than <50 years, taller than 180cm, had collarless stems, stems smaller than 10 and a metal on metal bearing.

Conclusions: This study underscores the elevated risk of mid-term loosening in previously well-integrated HA-coated stems. This risk appears to be more pronounced in younger, taller patients with smaller collarless stems and metal-on-metal bearings.

Dr. Mars Zhao
PGY2 – Orthopaedic Surgery
University of Saskatchewan

Supervisor: C. Elaschuk, T. Goldaded, E. Parchomchuk, J. Ashique, A. Maqsood, S. Girgies, M. Beaulieu, G. King, J. Van Der Merwe

CAUSATIVE FACTORS ASSOCIATED WITH VARUS SUBSIDENCE OF THE TIBIAL COMPONENT IN PRIMARY TOTAL KNEE ARTHROPLASTY

Background: Fracture of the tibial component after total knee arthroplasty (TKA) leads to high rates of morbidity and mortality. Aseptic varus tibial baseplate subsidence (VTBS) is not well described. We investigated pre-and post-operative patient and surgical factors including a novel Coronal Plane Alignment of the Knee (CPAK)classification on the effect on aseptic VTBS.

Methods: This retrospective review included 120 patients with aseptic VTBS from 838identified patients requiring TKA revisions between April 2013–March 2023. We excluded loosening secondary to infection and trauma. We compared pre-and post-operative CPAK classification alongside patient and surgical factors against a control group of 52 patients.

Results: VTBS group had higher rates of tibial component undersize and overhang ($P \leq 0.001$), lower rates of tibial stems ($P \leq 0.001$), higher rates of OSA ($P \leq 0.001$) and increased BMI ($P = 0.003$), higher Charlson Comorbidity Index ($P \leq 0.001$), and a higher proportion of patients in CPAK group 2 ($P = 0.044$). Both groups' pre-operative CPAK classifications had majority in group 2 (VTBS, control: 33.3%, 30.8%) followed by group1 (25.5%, 26.9%). Both groups' post-operative CPAK classifications had majority ingroup 5 (70.2%, 84.6%) followed by group 2 (21.9%, 11.5%).

Conclusion: Our results suggest aseptic VTBS may not relate to pre-op CPAK classification but have higher rates when placed in CPAK 2 classification post-operatively. Additional risk factors for VTBS group are suggested to be medial tibial base plate undersize and overhang, absence of tibial stem extension, OSA and BMI comorbidities, and higher Charlson Comorbidity Index.

Dr. Soroush Nedaie
PGY1 – Orthopaedic Surgery
University of Manitoba

Supervisor: D. Slawaska-Eng, Aaron Gazendam, Seper Ekhtiari, Thomas Wood1, 1McMaster University

ARE OUTCOMES OF A FIRST TOTAL JOINT ARHTOPLASTY ASSOCIATED WITH OUTCOMES OF A SUBSEQUENT TOTAL JOINT ARTHROPLASTY OF A DIFFERENT JOINT?

Background: Although research has shown outcomes of a first total knee arthroplasty (TKA) can predict those of a subsequent contralateral TKA, the relationship between non-cognate total joint arthroplasty (TJAs)remains unclear. This study explored whether out comes from a first staged TJA (e.g., total hip arthroplasty (THA)) can predict outcomes of a subsequent TJA in a different joint.

Methods: This study retrospectively reviewed data from an arthroplasty database of20,679 primary TJA cases (1999–2019). Eligible patients underwent both TKA and THA with complete preoperative and postoperative outcome scores. Two groups were analyzed: THA followed by TKA, and TKA followed by THA. Outcome measures included oxford hip and knee scores (OHS and OKS), the likelihood of achieving a minimally important difference (MID), and the odds of achieving a satisfactory outcome based on the Patient Acceptable Symptom State (PASS) score. Statistical analysis included T-tests, Chi-square or Fisher's Exact Tests ($p < 0.05$).

Results: In the THA-TKA group, patients who failed to reach PASS after THA were at increased risk of failing to reach PASS after TKA (OR 2.577; 95% CI 1.207-5.5;P=0.014). Similarly, those who did not achieve MID after THA had a higher risk of failing to reach MID after TKA (OR 4.7; 95% CI 0.877-25.0; P<0.001). In the TKA-THA group, failure to reach PASS after TKA significantly increased the risk of failing to reach PASS after THA (OR 10.2; 95% CI 3.44-30.12; P=0.05), though no significant association was found between failing to reach MID after TKA and achieving MID after THA (OR 2.4;95% CI 0.231-25.4; P=0.447). Regardless of the sequential order of TJA, there were no significant differences in postoperative OKS/OHS or rates of satisfaction between groups.

Conclusion: Dissatisfaction with a first TJA emerged a key predictor for dissatisfaction for a subsequent TJA of a different joint.

Dr. Kyle Goldstein
PGY3 – Orthopaedic Surgery
University of Saskatchewan

Supervisor: Michael E., Nickol, Johannes M. Van Der Merwe

ASSESSING THE LEARNING CURVE WHILE SWITCHING INCORPORATING A NEW FEMORAL STEM IN TOTAL HIP ARTHROPLASTY: A NON-RANDOMIZED CONTROL TRIAL

Background: Total hip arthroplasty (THA) is a common surgical procedure that aims to relieve pain, improve function, and increase mobility in patients with hip joint pathology. It is considered one of the most successful surgeries in all of medicine, but is still undergoing major innovation. There are various femoral stem components available for a surgeon to use, and more continue to be developed. However, once a surgeon has become comfortable with a given implant, they may be reluctant to undergo a learning curve for a different femoral stem. The primary objective of this study was to evaluate if a learning curve exists while incorporating a new femoral stem into a surgeon's practice.

Methods: This non-randomized control trial evaluated three groups of patients undergoing primary THA. The first group involved patients using a Zimmer M/L Taper Hip Prosthesis, which the surgeon had previously used. The second group evaluated the first cohort of patients with a Zimmer Avenir Complete Hip System, which was new to the surgeon. The third group consisted of the next cohort patients also using the Avenir femoral stem. Outcomes included femoral stem subsidence at 6 weeks postoperatively and the percentage of the diaphyseal canal that the femoral stem occupied, as measured on post-operative radiographs, as well as patient-reported outcomes as measured with the Oxford Hip Score and a Quality of Life Score.

Results: A total of 115 patients were included in the study. There was no significant difference between groups in femoral stem subsidence or diaphyseal canal filling on AP radiographs. There was significantly greater diaphyseal canal filling in both Avenir groups compared to the M/L Taper group, but no difference between Avenir groups. There were no significant differences between groups in surgical complications or in patient reported outcomes.

Conclusions: In this study, we demonstrated that there was no learning curve when transitioning from the M/L taper stem to the Avenir stem. This may give surgeons confidence to switch to femoral stems with improved designs in their own practice.

Dr. Alex Le
PGY3 Orthopedic Surgery
University of Saskatchewan

Supervisor: Oksana Prokopchuk-Gauk, Scott Williams

REDUCING ANEMIA IN HIGH RISK HIP FRACTURES: A QI PROJECT

Background: Hip fractures fixation is a commonly required but higher risk procedure with elevated morbidity and mortality in the peri-operative period. Pre-operative anemia is a common modifiable risk but may not always be treated due to the rapid timeline to surgery as well as ease of treatment. There are high quality studies reviewing transexamic acid and IV iron utilization in the treatment of bleeding and anemia in hip fractures but is not currently consistently utilized in Saskatoon and across Canada.

Methods: A quality improvement project will be completed reviewing implementation of a order set with routine use of TXA on admission as well as IV iron administration in at risk patients. Pre-operative and post-operative hemoglobin will be reviewed as well as transfusion rates. Transfusion rates, length of stay, readmission to hospital and complication rate will be reviewed and compared to a cohort of patients prior to implementation.

Results: Pre and post implementation data will be gathered for comparison of prescribing patterns, resident/nursing challenges to implementation as well as review of clinical impact. Statistical analysis will compare change in hemoglobin, transfusion rate and the overall number needed to treat.

Dr. Monther Abuhantash
PGY5 - Orthopedic Surgery
University of Manitoba

Supervisor: Drs. Ashley Stewart-Tufescu, Tamara Taillieu, Isuru Dharmasena, Ian Laxdal, James McCammon, Tracie O. Afifi

INVESTIGATING PEDIATRIC MUSCULOSKELETAL AND HEAD INJURIES DURING THE COVID-19 PANDEMIC IN MANITOBA

Background: There is a dearth of evidence informing our understanding of how theCOVID-19 pandemic affected pediatric trauma in Manitoba. The aim of the study was to analyze the effect of the pandemic on the rate of pediatric musculoskeletal (MSK) and head injuries, and its association with patients' demographic characteristics.

Methods: This is a retrospective cohort study of pediatric patients who presented to an emergency department (ED) or hospitalized for further treatment for an MSK or head injuries at a single tertiary hospital. Pre-pandemic and pandemic patient cohorts were created and the rates of MSK and head injuries in the two cohorts were compared by patients' sex, age, and area of residence.

Results: During the pre-pandemic, ED presentations with an MSK or head injury were lower in patients from rural communities compared to urban communities (RR: 0.68,p<0.001 and RR:0.51, p<0.001 respectively for each injury). Hospitalizations were higher in patients from rural communities for MSK and head injuries (RR: 1.78, p<0.001and RR:1.14, p=0.62respectively). During the pandemic, MSK injury ED presentations (RR:1.14, p=0.037) and hospitalizations (RR:1.78, p<0.001) were higher in patients from rural communities compared to urban communities. Patients from rural communities had lower rate of head injury ED presentations (RR:0.81, p<0.001) but higher hospitalization rates (RR:1.96, p=0.001).

Conclusions: This study identified important differences in rates of ED presentations and hospitalizations of pediatric MSK and head injuries amongst patients from rural and urban communities during the COVID-19 pandemic in Manitoba. It is possible that this is in part due to the geographical uniqueness of Manitoba with its widespread underserved rural communities and limited healthcare resources. Efforts should be made to rectify these inequities to ensure a fair access to healthcare for these patients.

Dr. Darren Van Essen
PGY2 – Orthopaedic Surgery
University of Manitoba

Supervisor: Megan Skakum, Dan Ogborn, Susan Thompson, Lori-Anne Archer, Ian Laxdal

IMPROVING POSTOPERATIVE PAIN MANAGEMENT IN PEDIATRIC ORTHOPEDIC SURGERY: A QUALITY IMPROVEMENT INITIATIVE USING PATIENT AND PARENT EDUCATION

Background: Effective post-operative pain management is essential in pediatric orthopedic trauma surgery to ensure optimal outcomes and patient satisfaction. However, inadequate patient and parent education on pain management strategies can lead to suboptimal pain control and decreased patient and family satisfaction. This quality improvement research project aims to enhance postoperative pain management education for pediatric orthopedic surgery patients and their parents to improve pain control and overall satisfaction.

Methods: Pediatric orthopaedic trauma patients undergoing day surgery procedures at the Winnipeg Children's Hospital will be the target population. An evidence-based educational resource on post-operative pain management will be given to patients and families prior to discharge as the study intervention. Post-operative pain scores will be collected with visual analog scales. Medication utilization will be collected with medication diaries. Data on patient or parent, and surgeon satisfaction scores will be collected with questionnaires using Likert Scales.

Results: Three months of pre-intervention data, and three months of post-intervention date will be collected and stratified by surgical procedure. Recorded results will be visual analog pain scales by post-operative day, doses of pain medication by post-operative day, and Likert Scale scores of patient or parent satisfaction, and surgeon questionnaires. Mean values will be calculated and stratified by surgical procedure. Mean scores for each outcome pre-and post-intervention will be compared, ($p<0.05$ for statistical significance). Any patients who had post-operative complications that could alter pain management will be excluded.

Conclusion: We hypothesize that post-intervention pain scores will be decreased, medication utilization will be increased, and patient, parent, and surgeon satisfaction will be increased. This project will inform best practices for post-operative pain management education in other realms of pediatric orthopedic surgery.

Dr. Riley Hemstock
PGY5 - Orthopaedic Surgery
University of Manitoba

Supervisors: Prushoth Vivekenantha, Praveen Srinathan, Jansen Johnson, Darren de SA

OSTEOCHONRDITIS DISSECANS LESIONS OF THE FEMORAL TROCHLEA: A CASE REPORT AND SYSTEMATIC REVIEW

Background: Osteochondritis dissecans (OCD) lesions of the femoral trochlea are rare, comprising2% of all OCD lesions. Few cases are reported in the literature, all consisting of case reports and case series, many of which occurred before the routine use of MRI, which revolutionized classification and management. The patella femoral joint experiences larger forces than the tibiofemoral joint, where more common medial femoral condyle OCD lesions occur. This has raised concern that traditional treatment strategies, specifically conservative management for femoral trochlear OCD lesions, may not be as successful.

Methods: We present the case of a 16-year-old male competitive soccer player found to have an OCD lesion of the femoral trochlea. In addition, we performed a systematic review of the literature. Three databases (MEDLINE, PubMed and EMBASE) were searched for studies describing outcomes for operative and nonoperative treatment strategies in patients with femoral trochlear OCD. The authors adhered to the PRISMA guidelines and used MINORs criteria to assess study quality. Indications for operative management and operative descriptions were extracted. Outcomes included patient reported outcome measures, revision rates, complications, and rate of return to sport.

Results: Our case report provides a descriptive summary of the presentation, diagnostic work-up, operative intervention and outcome for this femoral trochlear OCD lesion. In our systematic review, twenty studies comprising 105 patients (119 knees) were included. A total of 89 (74.7%) of patients received operative management. Lysholm and International Knee Documentation Committee scores in 20 patients ranged from 93.4-100 and 74.7-96.6, respectively. The revision rate for operative procedures was 9.0%, and the overall rate of return to sport was 93.3%.

Conclusions: There is very little high-quality evidence investigating patients with femoral trochlear OCD lesions. Patients were most often treated with operative management, had a low revision rate and returned to sport at a high rate.

Dr. Mars Zhao
PGY2 – Orthopaedic Surgery
University of Saskatchewan

Supervisor: Thomas Goldade, Evan Parchomchuk, Samuel Girgis, Jans Van Der Merwe

COMPARATIVE DIAGNOSTIC VALUE OF SEROLOGICAL AND SYNOVIAL TESTS FOR PERIPROSTHETIC JOINT INFECTIONS: A COMPREHENSIVE ANALYSIS

Background: Prompt diagnosis of periprosthetic joint infections (PJIs) is crucial to provide optimal care. Currently, there are no gold standard tests. An ideal test would be simple to implement, cost effective and readily available. We aimed to determine the best single or combined serological or synovial markers for diagnosing PJIs.

Methods: One-hundred and seventy-seven out of 313 patients with PJIs between April2012–March 2023 and a control group of 60 patients were included in this retrospective review. Serum (C-reactive protein (CRP), white blood-cell (WBC) count, neutrophil-lymphocyte ratio (NLR), percent polymorphonuclear neutrophil (%PMN)) and synovial fluid (WBC, NLR, %PMN) parameters were compared between the two groups. We determined the sensitivity, specificity, area under the curve (AUC), cut-off values(COV) for each marker. We determined the best combination of markers to diagnose PJIs.

Results: There was no statistical significance between the demographic data of the control and treatment group. S-CRP had the highest AUC 0.912 with COV of 16.15mg/dl (Sensitivity 79.6%, Specificity 97.8%). The combination of tests, S-CRP, SF-WBC, and S-NLR demonstrated the highest AUC of 0.946 (Sensitivity 93.0%, Specificity90.9%). The COV for SF-WBC is 5.75 cells/ul (AUC 0.803; Sensitivity 70.3%, Specificity97.1%); S-NLR COV is 3.659 (AUC 0.803; Sensitivity 67.3%, Specificity 88%.

Conclusions: We found the combination of S-CRP, SF-WBC and S-NLR to be a valuable in diagnosing PJI with high sensitivities and specificities. It can be easily implemented by clinicians without additional cost or equipment. It is important to use this with a thorough clinical and physical examination and other modalities (i.e.MSIS/EBJIS criteria).

Dr. Madison Price
PGY4 – Orthopaedic Surgery
University of manitoba

Supervisor: Odile Huynh, Bradley Pilkey, Ted Tufescu, Allan Hammond, Chris Graham, Garbiel Larose

POWDER4ED INTRAWOUND VANCOMYCIN IN OPEN FRACTURES: A RANDOMIZED CONTROLLED TRIAL (PIVOT)

Background: Open fractures are at increased risk of post-operative infection. Intrawound vancomycin powder is a recent intervention in open fractures to decrease infection risk. Randomized controlled trials studying intraoperative intrawound vancomycin powder on open fractures have only investigated tibial fractures. This study will compare upper and lower extremity open fracture post-operative infection rates in participants receiving intrawound vancomycin powder plus standard of care (intravenous antibiotics with irrigation and debridement)compared to standard of care alone during definitive fixation.

Methods: The study is a prospective, randomized, double blind (participants and end-point assessors),controlled trial.350 participants undergoing surgery for an upper or lower extremity open long bone fracture (Gustilo I to IIIc) will be enrolled. Following hardware fixation during definitive surgery, participants will be stratified by extremity region and randomized at a 1:1 ratio to receive 1000 mg of intrawound vancomycin powder plus standard of care, versus standard of care alone. Participants will be followed post operatively for six months. The primary outcome is postoperative infection requiring operative intervention. Secondary outcomes are postoperative infection not requiring operative intervention, hospital read missions, and hardware failure. In participants with postoperative infections, fracture location, Gustilo Classification, injury mechanism, and microbiology will be compared.

Results: Data on surgical infections, readmissions, and hardware failure will be expressed as binary outcomes. Absolute and relative risk reductions will be calculated. Intention to treat analysis will be used. Multivariate regression will be used if baseline characteristics are uneven between treatment arms.

Conclusion: This randomized controlled trial would be the first to investigate intra operative intrawound vancomycin powder in open fractures other than the tibia. This will inform whether this intervention should be recommended for all open fractures, reserved for specific fractures (e.g., location, severity), or conversely, should be recommended against in certain open fractures for cost, decreased utility and antibiotic stewardship.

Dr. Colleen Nesbitt
PGY2 – Orthopaedic Surgery
University of Saskatchewan

Supervisor: Dr. P. Philippe, Dr. H. Rees, Dr. S. Willms

EVALUATION OF A GLOBAL TRAINING PROGRAM IN ORTHOPEDIC SURGERY

Background: Providing advanced training to surgeons from low-and middle-income countries (LMICs) has been proposed as a method to enhance the quality of surgical care in these nations. However, these surgeons have historically been excluded from advanced orthopedic training in high income countries. To address this exclusion, a post-graduate training program was developed in the Division of Orthopedic Surgery at the University of Saskatchewan specifically for orthopedic surgeons from LMICs. This study aims to evaluate the impact the program had on the surgical trainee, residents, and staff in its inaugural year.

Method: To assess the impact of teaching and environment on surgical skills, the LMIC surgical trainee maintained a surgical case log and participated in surveys at the beginning, at six months, and at the end of the program. Successful integration of the program was evaluated through surveys completed by staff surgeons and residents at the conclusion of the year.

Results: The inaugural year hosted an orthopedic surgeon from Haiti, who participated in 614 surgeries across nine specialties. The surgeon engaged in outpatient, inpatient, and emergency patient care, as well as teaching and research. The trainee faced challenges adapting to the new healthcare system, high living costs, and cultural barriers, but felt well-supported by staff and residents. By year's end, the trainee reported increased efficiency in the operating room and felt 'very confident' in their surgical techniques. Low staff response limited insights on the trainee's integration, but residents had positive experiences and noted significant learning regarding orthopedic surgery in resource-limited settings.

Conclusion: This research demonstrates the feasibility of successfully integrating a surgeon from a LMIC. The trainee gained valuable surgical exposure, confidence in skills, and acquired new surgical techniques. Both residents and staff reported no negative impacts from the trainee's presence and expressed an overall positive outlook on the Global Training Program.

Dr. Melinda Fowler-Woods
PGY5 - Orthopedic Surgery
University of Manitoba

Supervisor: Dr. Sheila McRae, Dr. Jarret Woodmass, Dr. Lori-Anne Archer, Dr. Steven Passmore, Dr. Michael Johnson

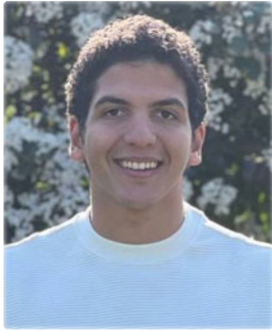
TELLING THE FULL STORY – MOVING TOWARDS MORE COMPREHENSIVE RESEARCH WITH AND FOR INDIGENOUS PEOPLES IN ORTHOPEDIC SURGERY

Background: The concerns, barriers, and strengths of Indigenous peoples in Canada are complex and distinct from non-Indigenous peoples and impact their health care needs. The aim of this presentation is to relay direct experiences in conducting Indigenous-focused health care research and provide insights on moving towards more comprehensive research in Canada.

Methods: Insights gained through conducting three projects with and for Indigenous peoples in Manitoba will be outlined: 1) socioeconomic determinants of health in Indigenous peoples of Manitoba undergoing shoulder and knee surgery; 2) Aboriginal Children's Hurt & Healing Initiative–Kids Hurt App usability; 3) Pimicikamak Spine Project.

Results: Undertaking Indigenous-focused research in Manitoba required adherence to ethical guidelines for conducting research for Indigenous peoples including building respectful relationships prior to discussing specific research projects and proceeding with purposeful and continual engagement between researchers and Indigenous communities. Prior to research activities taking place, consultative meetings were required with each distinct nation based Indigenous governance bodies: First Nations Health and Social Secretariat of Manitoba, Manitoba Metis Federation, and the Manitoba Inuit Association. These organizations sanctioned the projects to be undertaken based on the following requests: 1) results were to be presented as a whole, not distinguishing findings between distinct nations; 2) ongoing meetings were to be held throughout the study; 3) study findings were to be presented to each organization prior to dissemination to a general audience. Organizations did not request editorial rights over publications or presentations, researchers needed to demonstrate a willingness to receive honest and transparent feedback from Elders and leadership.

Conclusions: Indigenous ways of knowing and being have existed for decades in the form of storytelling. The stories come first. Being willing to listen and pair these stories with quantitative methodologies enriches our research, allowing us to tell the full story, and ultimately provide the best care.



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CANADIAN PROSPECTIVE PRAGMATIC PERILUNATE OUTCOMES TRIAL (C3PO)

Background: Perilunate injuries are rare, but serious injuries. Their pathognomonic feature is dislocation of the capitate from the lunate; which can happen either from aligamentous 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 of32 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 eage 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 wrists core average was 74(SD of 12). The quick dash scores average was 16(SD of 16), while quick dash work scoreaveragewas15(SD of 18). The PRWEaveragewas28(SD of 23.

Conclusions: Perilunate injurycauses 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.

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NON-OPERATIVE COSTS ASSOCIATED WITH MANAGEMENT OF THUMB BASAL JOINT ARTHRITIS

Background: Thumb basal joint arthritis (TBJA) is the second most common site of osteoarthritis in the hand and can greatly impair function. Some patients may be adequately managed with non-operative treatments such as oral and topical analgesia, physical therapy, orthoses, and intraarticular injections. Few studies have evaluated non-operative treatment costs in TBJA and limited data is available specific to the Canadian health care system. The purpose of this study is to evaluate the patient-reported non-operative costs incurred for the management of TBJA.

Methods: All consecutive patients presenting to three hand-fellowship trained surgeons with radiographic evidence of isolated TBJA will be recruited with an expected sample size of 200 patients. Patients with bilateral TJBA, concurrent ipsilateral hand pathologies, or previous ipsilateral hand surgeries will be excluded from the study. Patients will complete a standardized questionnaire evaluating costs incurred for non-operative treatments prior to and over the one-year period following their initial surgical consult (3, 6, 9 and 12 months).

Results: Estimated total non-operative costs will be presented in a descriptive analysis in aggregate and itemized by area (physical therapy, bracing/orthoses, intra-articular injections). Opportunity costs (estimated time loss from employment) incurred as a result of TBJA will also be determined. Rates of conversion to surgical management within the study period will also be calculated. Multiple logistic regression will be completed on aggregate non-operative costs against gender. Systems costs will be included (physician appointments, radiographs, and other diagnostics).

Conclusion: Knowledge of the non-operative costs associated with TBJA management have not been provided within the Canadian public health system. This data can be used, in the context of known surgical costs, to inform patient decision making regarding operative or non-operative management of TBJA.

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THE IMPACTS OF A NIGHT FLOAT CALL SYSTEM WITHIN AN ORTHOPEDIC RESIDENCY PROGRAM: A PROSPECTIVE ANALYSIS ON RESIDENT WELLNESS, SATISFACTION, AND EDUCATION

Background: The University of Saskatchewan orthopedic program has historically utilized a 24-hour call system to cover the orthopedic trauma service. The high number of post call days lead to significant disruption from clinical and academic duties. Additionally, resident wellness and quality of life is largely impacted by work hours and call burden. Some Canadian orthopedic programs have successfully implemented a night float alternative and reported improved resident quality of life and satisfaction. Other programs have made a similar switch and reported worse health-related quality of life. 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: This prospective study began data collection in May 2023. Orthopedic residents completed surveys at the end of every4-weekrotation. These surveys assessed health status (SF-36 scores), educational outcomes, and resident satisfaction. We compared the data of three different cohorts: traditional24-hour call residents, the night float resident, and non-night float residents working within a night float system. Currently we are conducting semi-structured interviews to collect qualitative analysis and further investigate resident perceptions of the night float system.

Results: Statistical analysis is currently underway as of September 2024and should be available within the following2-3 weeks. Results will include comparison of SF-36scores, overall satisfaction with the new system, and educational outcomes including teaching rounds attendance and volume of consults.

Conclusion: The results of this study will help support or discourage the utility of a night float call system. We intend to share the outcomes with other programs to encourage positive changes that optimize resident wellness, educational outcomes, and workplace satisfaction.

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THE EFFECT OF LOOPED SUTURE ORIENTATION ON THE BIOMECHANICAL PROPERTIES OF TENDON/LIGAMENT GRAFT RECONSTRUCTION: AN IN VITRO PORCINE MODEL BIOMECHANICAL STUDY

Background: Tendon and ligament rupture and repair remains an area within orthopedics with no clear consensus as to the best practice for suture repair and reconstruction. Currently several companies have high strength looped sutures marketed for tendon and ligament reconstruction with associated basic whip stitch technique guidelines. The purpose of this this study is to determine if the suture pattern, direction and loop tail orientation influences biomechanical properties of a suture tendon/ligament construct and to propose and compare two novel suture techniques to industry standards.

Methods: Porcine flexor digitorum profundus tendons harvested from fresh cadavers will be utilized. Number 2 Fiber loop sutures (Arthrex, Naples, Flordia) and suture tendon constructs will be performed and record by one member of the research team. Three patterns will be tested; the current standard of care at our center as described by Muscatelli *et. al*, against two novel, techniques the bi-directional and alternating whip as well and the locked looped suture techniques. Each construct will be tested on the Instron Electropuls E10000. Outcome measures will include preparation time (s), elongation (mm), cycles and peak load to failure(N), stiffness (N/m) and failure mode.

Results: One-way ANOVA ($p<0.05$) will be used to compare between groups across continuous outcome.

Conclusion: The goal of this study is to identifyif thesenovel suture techniques can improve biomechanical properties of reconstructions while utilizing the same materials, without significantly increasing operative time or complexity. Superior cost and time effective constructs could decrease graft failure rates, improve early active mobilization and patient satisfaction.

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SURGEONS' PREDICTION OF PATIENRS' POSTOPERATIVE 1-YEAR SANE SCORE FOLLOWING ROTATOR CUFF REPAIRD SURGERY

Background: Pre-operative patient expectations are thought to be predictors of outcomes in rotator cuff repair (RCR) surgery. Given their knowledge and clinical expertise, surgeons can potentially predict patient outcomes better than patients themselves. Thus, surgeon prediction of surgical outcomes could be used to set realistic patient expectations ahead of surgery to optimize outcomes. The purpose of the study was to determine the surgeon's and patient's accuracy in predicting patient's outcome one year following RCR.

Methods: Data was collected in a healthcare registry as standard of care for all patients undergoing RCR from January1 to December31, 2022at a single surgical center. The primary outcome was the SANE score (Single-Assessment Numeric Evaluation) where patients rate their shoulder function out of 100%, preoperatively and at one-year postoperatively. The surgeon was asked to predict the 1-year SANE score immediately following completion of the surgery. A repeated-measures ANOVA compared surgeon-predicted, patient-predicted, and actual mean1-year post-operative SANE scores. The differences between actual and surgeon-predicted SANE scores, and actual and patient-predicted SANE scores were calculated.

Results: Sixty-nine patients were included in this study with a mean age of 60.9(SD=6.9) years and 77%(N=53) were male. Surgeon-predicted1-yearpostoperativeSANE was 77.6% (range 60-95%, SD= 6.8%), patient-predictedwas88.7% (range 50-100%, SD=11.1%), and actual SANE was 80.6% (range 8-100%, SD=19%) ($p<0.001$). Mean patient-predicted scores were significantly higher than both mean surgeon-predicted ($p<0.001$) and mean actual postoperative SANE($p=0.002$). There was no statistical difference between mean surgeon-predicted and mean actual postoperative SANE.

Conclusions: The findings of this study demonstrate discrepancy between surgeon prediction and patient expectation of the one-year outcome following RCR. Surgeons were better able to predict outcomes compared to patients, which raises the importance of preoperative patient counselling to set more realistic expectations that would potentially improve their achieved outcomes.

The Section of Orthopaedic Surgery would like to thank the contributor to this event: