# SURGERY IN ACTION ALBERTA CONFERENCE

## PROGRAM AND ABSTRACT BOOKLET

**1st Annual Surgery in Action Alberta Conference - May 9th 2026**
**University of Calgary, Calgary, AB**

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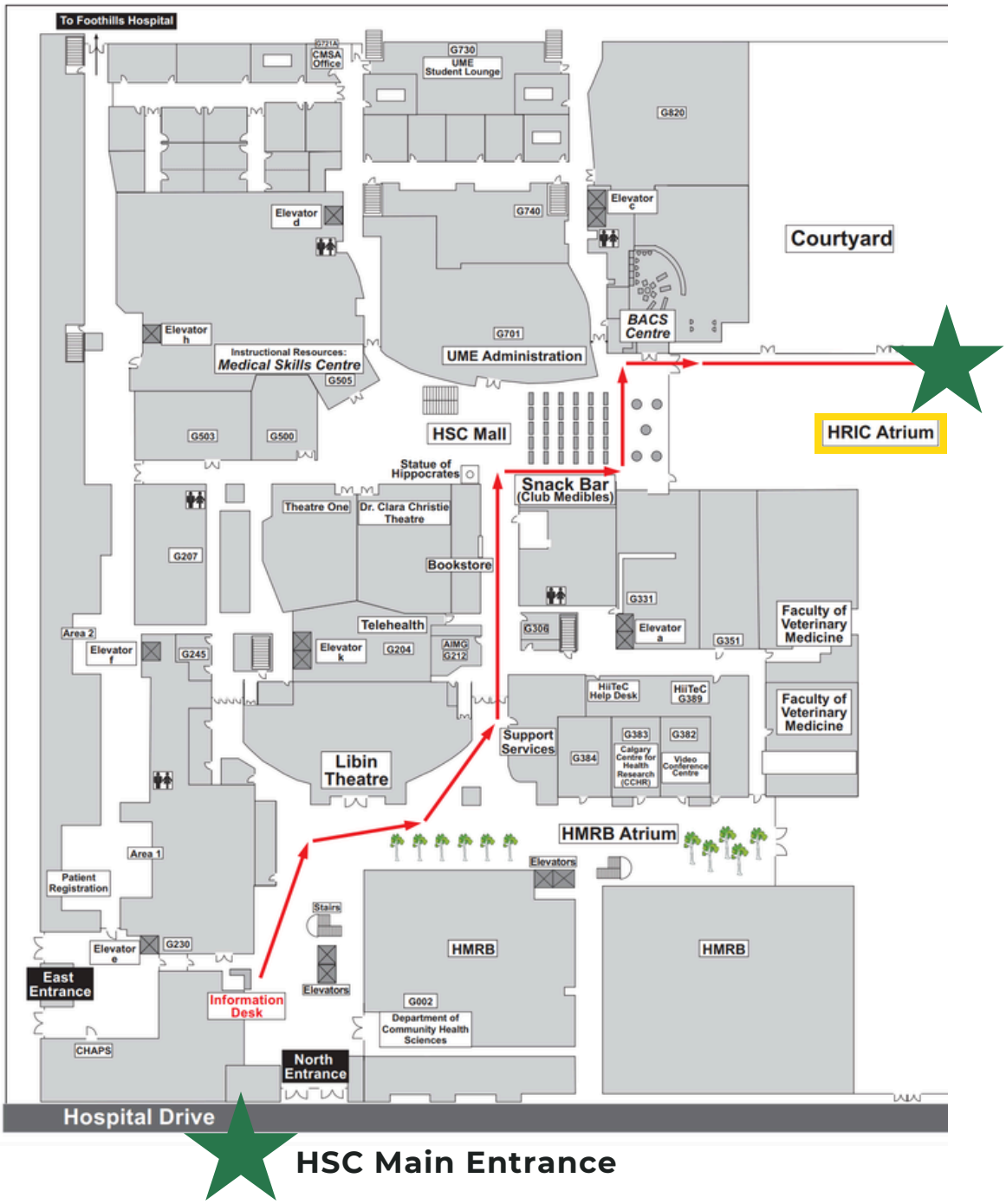


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**Emergency:** Waiting room
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**McCaig Tower**: Main level, by elevator lobby
**South Tower**: Lobby of level 4
**North Tower:** Main level by entrance ★ **Closest to main entrance**
**North (Lot 6):** Main level by elevator.
**West (Lot 10):** Levels 1 & 2

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- **Central lot**: Public stalls available on Main (M), P1 and P2 levels across from the elevator lobbies
- **West (Lot 10)**: public stalls available on levels 1 & 2
- **North (Lot 6):** Public stalls available on level 1
- **South Tower**: 2 public stalls available on level 1

## ATM Locations

- **Main Building**: Main floor
- **Special Services Building**: Main floor
- **Women's Health Centre**: Main floor
- **McCaig Tower**: Ground floor

# SCHEDULE

| TIME | SURGERY IN ACTION ALBERTA CONFERENCE<br>Saturday May 9th, 2026 |
|---|---|
| 8:00 – 9:00 am | **Registration and Poster Setup**<br>Coffee and light breakfast |
| 9:00 – 9:15 am | **Welcome Remarks from the SAAC Organizing Committee** |
| 9:15 – 10:00 am | **Keynote Speaker:** Dr. Tito Daodu |
| 10:00 – 10:30 am | **Trainee Oral Presentation Session #1**<br>10:00 – 10:15 am Elvira Nurmambetova<br>10:15 – 10:30 am Tom Ding |
| 10:30 – 11:00 am | **Morning Coffee Break** |
| 11:00 – 11:45 am | **Keynote Speaker:** Dr. Candice Poon |
| 11:45 – 12:15 pm | **Trainee Oral Presentation Session #2**<br>11:45 – 12:00 pm Paige Croney<br>12:00 – 12:15 pm Adrien Lam |
| 12:15 – 1:00 pm | **Lunch**<br>*Sponsored by Shivji Financial & Mount Columbia Private Wealth* |
| 1:00 – 2:00 pm | **Poster Session** |
| 2:00 – 2:45 pm | **Keynote speaker:** Dr. Rebecca Hartley |
| 2:45 – 3:00 pm | **Awards & Closing Remarks from the SAAC 2026 Organizing Committee** |
| 3:00 – 4:00 pm | **Social / Networking Time**<br>Coffee and light snacks |

# ORGANIZING COMMITEE

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# Abstract Booklet: Table of Contents

| **Keynote Speakers** | | |
|---|---|---|
| **Dr. Tito Daodu, MD, MPH, FRCSC** | | |
| **Dr. Rebecca Hartley, MD, MSc, FRCSC** | | |
| **Dr. Candice Poon, MD, PhD, FRCSC** | | |
| *Abstracts selected for oral presentations* | | |
| **Last Name** | **First Name** | **Institution** |
| Croney | Paige | University of Calgary |
| Ding | Yu (Tom) | University of Calgary |
| Lam | Adrien | University of Alberta |
| Nurmambetova | Elvira | University of Alberta |
| *Abstracts selected for poster presentations* | | |
| **Last Name** | **First Name** | **Institution** |
| Ali | Farah | University of Calgary |
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| Sung | Hyelin | University of Alberta |
| Sunil | Nidhin | University of Calgary |
| Yung | Olivia | University of Calgary |

# SAAC 2026 Keynote Speakers

## Dr. Tito Daodu

Dr. Tito Daodu, MD, FRCSC, is a Pediatric Surgeon at Alberta Children's Hospital and an Assistant Professor in the Departments of Surgery and Community Health Sciences at the University of Calgary. In 2020, she became the first Black female pediatric surgeon in Canada. Dr. Daodu is an award-winning researcher and educator whose work focuses on health equity, anti-racism, and improving access to surgical care for underserved populations. She has secured over $1 million in research funding and published extensively on how race, geography, and systemic barriers affect surgical outcomes, particularly for Indigenous, rural, and racialized patients.

## Dr. Rebecca Hartley

Dr. Rebecca Hartley is a Fellow of the Royal College of Surgeons of Canada and a Clinical Assistant Professor at the University of Calgary. Born in Richmond, British Columbia, she earned her medical degree at the University of British Columbia and completed her Plastic and Reconstructive Surgery residency at the University of Calgary. During residency, Dr. Hartley was accepted into the Clinician Investigator Program and completed a Master's degree in Epidemiology, reflecting her strong commitment to evidence-based care. She went on to pursue fellowship training in Pediatric Plastic Surgery at BC Children's Hospital in Vancouver. She currently practices at the Alberta Children's Hospital as well as the Rockyview General Hospital. Outside of medicine, Dr. Hartley is a proud mother and partner. She enjoys spending time with her family, staying active through sports, and reading.

**Dr. Candice Poon**

Dr. Candice Poon is a Neurosurgeon and Assistant Professor in the Department of Clinical Neurosciences and Oncology at the University of Calgary. She obtained her B.Sc. in Neuroscience and MD at the University of Alberta, followed by Neurosurgical residency at the University of Calgary. Dr. Poon completed a Ph.D. in Neuro-oncology and Neuroimmunology, and, following residency, she completed a fellowship in neurosurgical oncology at the University of Texas. She specializes in Surgical Neuro-Oncology, treating various CNS cancers, including gliomas and brain metastases. She also runs an active research laboratory focused on Neuro-Oncology and Neuroimmunology, investigating the interactions between the immune system, cerebrospinal fluid and CNS cancers. The lab combines the use of cutting-edge and big data techniques to develop innovative, novel therapeutic strategies and improve drug development for the treatment of CNS cancers. They are also pioneering the study of the glymphatic system within CNS tumors by utilizing advanced microscopy techniques and applying AI to the analysis of clinical imaging, surgical and molecular data.

# Morphological Profiling of Human Pluripotent Stem Cell-Derived Cardiomyocyte Maturation Through High-Content Image Analysis

Yu Ding[1,2], Julie Audet[2], Craig A Simmons[1,2]

[1]Translational Biology & Engineering Program, [2]Institute of Biomedical Engineering, University of Toronto

Introduction: Human pluripotent stem cell-derived cardiomyocytes (hPSC-CMs) are increasingly used in cardiovascular disease modeling, cardiotoxicity testing, and regenerative research, but their translational utility remains limited by functional immaturity.[1] This is especially relevant for myocardial infarction and cardiac repair applications, where immature cells fail to recapitulate key adult cardiomyocyte properties and may contribute to arrhythmogenic risk.[2] Current methods for assessing maturation are low-throughput, resource-intensive, and poorly standardized. We aimed to develop a scalable, image-based assay capable of quantitatively distinguishing hPSC-CM maturation states to support preclinical cardiac modeling and maturation screening.

Methods: Human induced pluripotent stem cell-derived cardiomyocytes (hiPSC-CMs) were generated in 5 putative maturation states defined by culture time and media condition: timepoint 0, STEMCELL cardiomyocyte maintenance media for 1 or 3 weeks, and our proprietary, custom "C16" maturation media for 1 or 3 weeks.[3,4] Maturation states were independently examined by global proteomic profiling. Cells were stained for nuclei, α-actinin, connexin-43, and mitochondria, imaged by confocal microscopy, and analyzed using an adapted CellProfiler pipeline.[5] A total of 1,328 morphological features were extracted per cell, including size, shape, texture, intensity, and inter-channel spatial correlation features. Fast Gentle Boosting, Random Forest, and neural network classifiers were trained to classify maturation state from image-derived features.

Results: Proteomic clustering demonstrated distinct phenotypic differences across the 5 treatment groups, with more mature C16-cultured cells showing enrichment of proteins related to contractile machinery, sarcomere organization, mitochondrial development, and oxidative metabolism. Morphologically, C16-treated cells appeared more elongated, directionally aligned, and structurally organized, with more punctate and distributed mitochondrial signal and more organized connexin-43 localization. However, traditional single-feature analyses and unsupervised multidimensional clustering were insufficient to robustly separate all maturation states. In contrast, a 3-layer neural network classifier achieved a mean classification accuracy of 91.15%, outperforming Random Forest (85.56%) and Fast Gentle Boosting (69.6%). These findings indicate that maturation-related phenotypes are encoded in complex, nonlinear combinations of image-derived features not adequately captured by conventional single metrics.

Conclusion: High-content morphological profiling combined with machine learning can quantitatively classify hPSC-CM maturation with high accuracy and offers a scalable alternative to conventional low-throughput maturation assessments. This platform may support development of more clinically relevant human cardiac models for myocardial infarction, cardiotoxicity

testing, and regenerative strategies, with downstream translational relevance to cardiac repair and surgery.

References:

[1]Guo Y, Pu WT. Cardiomyocyte Maturation. Circ Res. 2020 Apr 10;126(8):1086–106. doi: 10.1161/circresaha.119.315862

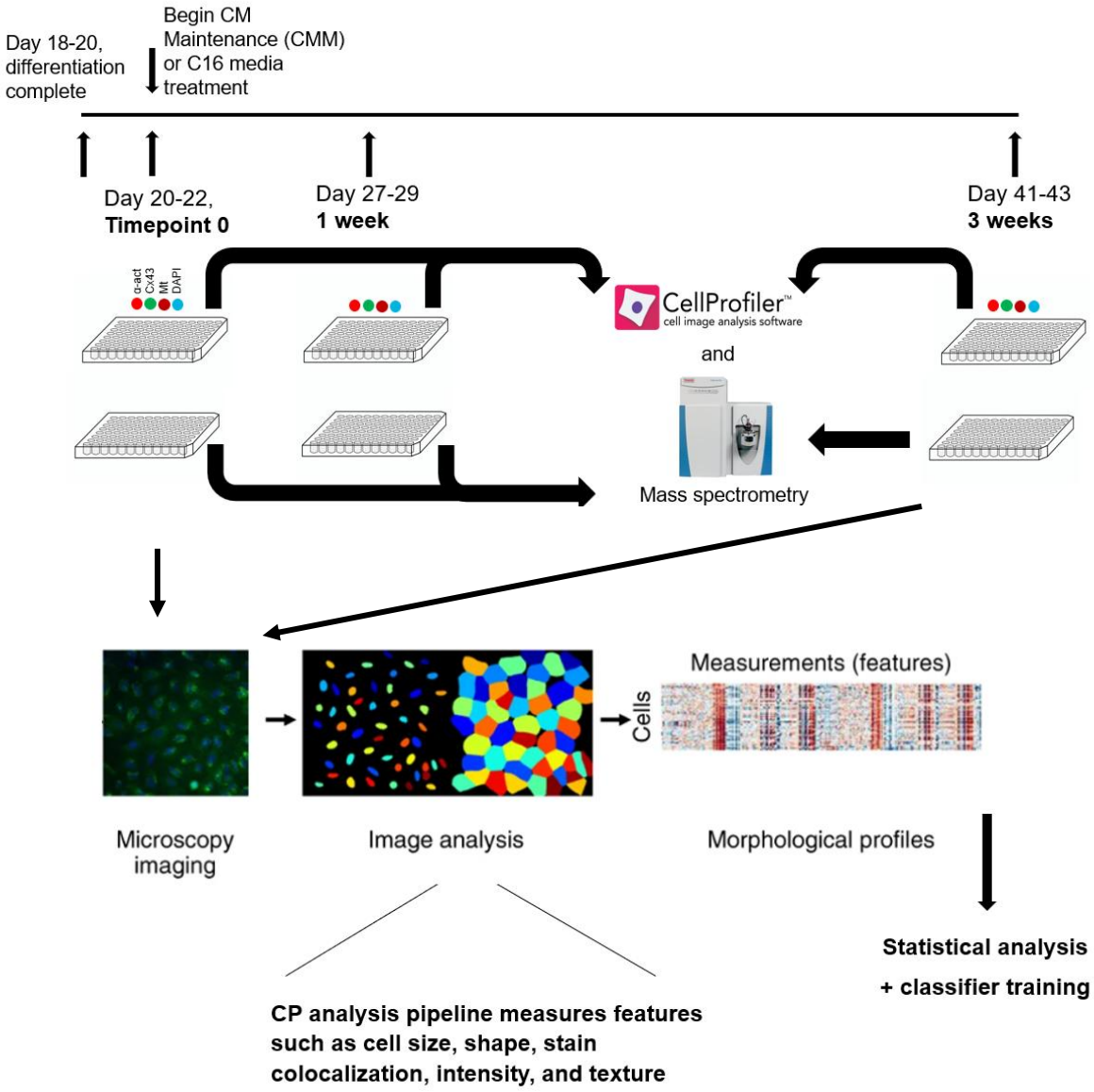
[2]Romagnuolo R, Masoudpour H, Porta-Sánchez A, Qiang B, Barry J, Laskary A, et al. Human Embryonic Stem Cell-Derived Cardiomyocytes Regenerate the Infarcted Pig Heart but Induce Ventricular Tachyarrhythmias. Stem Cell Reports. 2019 May 2;12(5):967–81. doi: 10.1016/j.stemcr.2019.04.005

[3]Callaghan NI, Durland LJ, Chen W, Kuzmanov U, Zena Miranda M, Mirzaei Z, et al. Advanced physiological maturation of iPSC-derived human cardiomyocytes using an algorithm-directed optimization of defined media components. bioRxiv [Preprint]. 2022 Oct 13. doi: 10.1101/2022.10.10.507929

[4]Ding Y. Morphological Profiling of Human Pluripotent Stem Cell-Derived Cardiomyocyte Maturation through High Content Image Analysis. [master's thesis]. [Toronto (ON)]: University of Toronto; 2025. 77 p.

[5]Carpenter AE, Jones TR, Lamprecht MR, Clarke C, Kang I, Friman O, et al. CellProfiler: image analysis software for identifying and quantifying cell phenotypes. Genome Biol. 2006 Oct 31;7(10):R100. doi: 10.1186/gb-2006-7-10-r100

Figure or Table:




**Workflow for high-content morphological profiling of hPSC-CM maturation across 5 treatment conditions.**

# High-Dose Enzymatic ABO-A Antigen Reduction in Human Saphenous Veins as a Translational Model for Pediatric Heart Perfusion

A. Lam[3], B. Motyka[1], M. Ellis[1], J. Pearcey[1], T. Pidborochynski[1], C. Li[1], A.J. Lesanko[1], M. Wagner[3], J. Kurach[2,6], P. Rahfeld[4], I. Ip[4], K. Jones[4], S.G. Withers[5], E.A. Simpson[2], N. William[2], R. EL-Andari[3], P. Hassanzadeh[3], D. Gutierrez[3], J.P. Acker[2,6], L.J. West[1,2,3,7], D.H. Freed[3], J. Conway[1]

[1]Dept of Pediatrics, University of Alberta, Edmonton, AB
[2]Dept of Laboratory Medicine and Pathology, University of Alberta, Edmonton, AB
[3]Dept of Surgery, University of Alberta, Edmonton, AB
[4]Avivo Biomedical Inc., Vancouver, BC
[5]Dept of Chemistry, University of British Columbia, Vancouver, BC
[6]Innovation and Portfolio Management, Canadian Blood Services, Edmonton, AB
[7]Dept of Medical Microbiology and Immunology, University of Alberta, Edmonton, AB

**Purpose**: ABO-incompatibility is a major barrier to donor availability for pediatric heart transplantation. Enzymatic removal of endothelial ABO-A antigens offers a potential strategy to expand donor compatibility, but clinically relevant dose thresholds have not been well defined. We evaluated whether enzymes FpGalNAc deacetylase and FpGalactosaminidase ('Azymes') at high-dose conditions (5 µg/mL) remove endothelial A-antigen, with reciprocal emergence of H-antigen, in human saphenous veins perfused ex situ. We further assessed this under clinically relevant subnormothermic and normothermic conditions, building on prior proof-of-concept studies in red blood cells, lungs, and kidneys.

**Methods**: Human saphenous veins from ABO-$A_1$ (genotyped) were perfused *ex situ* using STEEN Solution™ with ABO-O red blood cells at 22°C (subnormothermic conditions) or 37°C (normothermic conditions) for 1 or 3 hours under pressure-controlled conditions. Enzymatic treatment was performed using Azymes at a high-dose concentration of 5 µg/mL. Endothelial A-antigen and H-antigen expression was assessed by immunohistochemistry using anti-A (HE-193) and anti-H (BRIC-231) monoclonal antibodies. Quantification was performed by DAB-positive area analysis in QuPath, averaging six regions of interest per vein, focusing on the tunica intima. Non-perfused ABO-O and ABO-A1 veins were used as controls to establish baseline antigen expression. ABO-A1 veins perfused under identical conditions without enzyme treatment served as additional controls.

**Results**: Perfusion with Azymes at 5 µg/mL at both 22°C and 37°C resulted in marked endothelial A-antigen removal in the tunica intima compared with non-perfused ABO-$A_1$ controls. Endothelial A-antigens were reduced at both 1 and 3 hours at 22°C (0.00 ± 0.00%; 0.00 ± 0.00% DAB-positive area, n=3) ($p < 0.05$) compared to the non-perfused ABO-$A_1$ controls (0.95 ± 0.08%, n=3) (Figure 1A). Similarly, A-antigen were reduced following perfusion at 37°C for 1 and 3 hours compared to non-perfused controls (0.01 ± 0.01%; 0.00 ± 0.00% DAB-positive area, n=3) ($p < 0.05$). Endothelial H-antigen expression increased following 1 and 3 hours of enzyme treatment at 22 °C (0.92 ± 0.20%; 1.09 ± 0.26% DAB-positive area, n=3) ($p < 0.05$) compared to ABO-$A_1$ controls (0.10 ± 0.01%, n=3), trending toward the ABO-O baseline (1.15 ±

0.18%, n = 3) ($p \geq 0.05$) (Figure 1B). With enzyme treatment at 37°C, similar patterns of H-antigen emergence at 1 and 3 hours were observed in comparison to treatment at 22°C (0.81 ± 0.13%; 1.42 ± 0.06% DAB-positive area, n=3) ($p \geq 0.05$).

**Conclusion**: High-dose enzymatic treatment at 5 μg/mL effectively removed endothelial A-antigen while exposing H-antigen determinants in the tunica intima of human saphenous veins under subnormothermic conditions. These findings inform optimization of enzyme delivery for future pediatric whole-heart perfusion studies aimed at ABO-$A_1$ to -O conversion to expand the donor pool and reduce waitlist mortality.

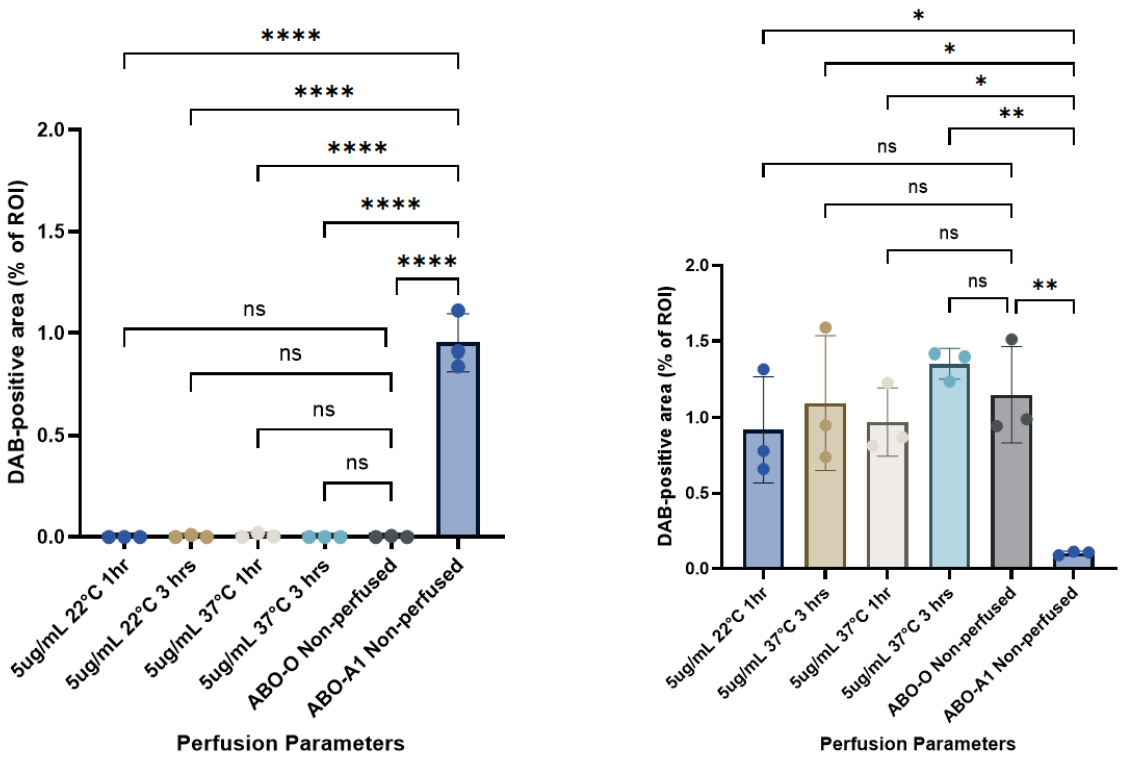



**Figure 1.** Endothelial (tunica intima) A- and H-antigen expression in human saphenous veins compared to non-perfused controls following Azyme treatment (5 µg/mL) at 22 °C or 37 °C for 1 or 3 hours. DAB-positive area (% ROI) was quantified and compared with non-perfused ABO-A$_1$ and ABO-O controls. Data shown as mean ± SEM (n = 3). *p < 0.05, **p < 0.01, ***p < 0.001, ****p < 0.0001; ns, not significant. DAB: 3,3′-diaminobenzidine.

# Minimally Invasive Mitral Valve Repair with Complex Neochordal Reconstruction

Ryaan EL-Andari[1], MD, Maira Machhiwala[2], MBT, Elvira Nurmambetova[2], BHSc, Michael Moon[1], MD, Jeevan Nagendran[1], MD, PhD.

[1]Division of Cardiac Surgery, University of Alberta, Edmonton, Alberta, Canada

[2]Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada

Introduction: Mitral valve repair (MVr) provides superior long-term outcomes for patients with mitral regurgitation (MR), and minimally invasive MVr (MIMVr) has become the preferred approach at high-volume centers. At our center, we have developed a standardized strategy that allows for reproducible production of neochordae and results in a reliable plane of coaptation across the entire valve using multiple neochordae in conjunction with the Mohr loop technique, allowing for preoperatively prepared, fixed-length neochordae.[1] This approach aims to optimize precision, reproducibility, and operative efficiency. Herein, we provide the midterm outcomes of patients undergoing a novel MIMVr technique.

Methods: MIMVr was performed at a single center via right anterior minithoracotomy. The approach to MVr included the immediate preoprocedural creation of neochords utilizing a previously described standardized approach involving the creation of 2 sets of neochords with 6 anterior chords and/or 8 posterior chords. This technique has previously been reported and allows for the creation of a new plane of coaptation of the MV. All patients underwent neochordal repair with an annuloplasty ring at a single center between 2019-2024.

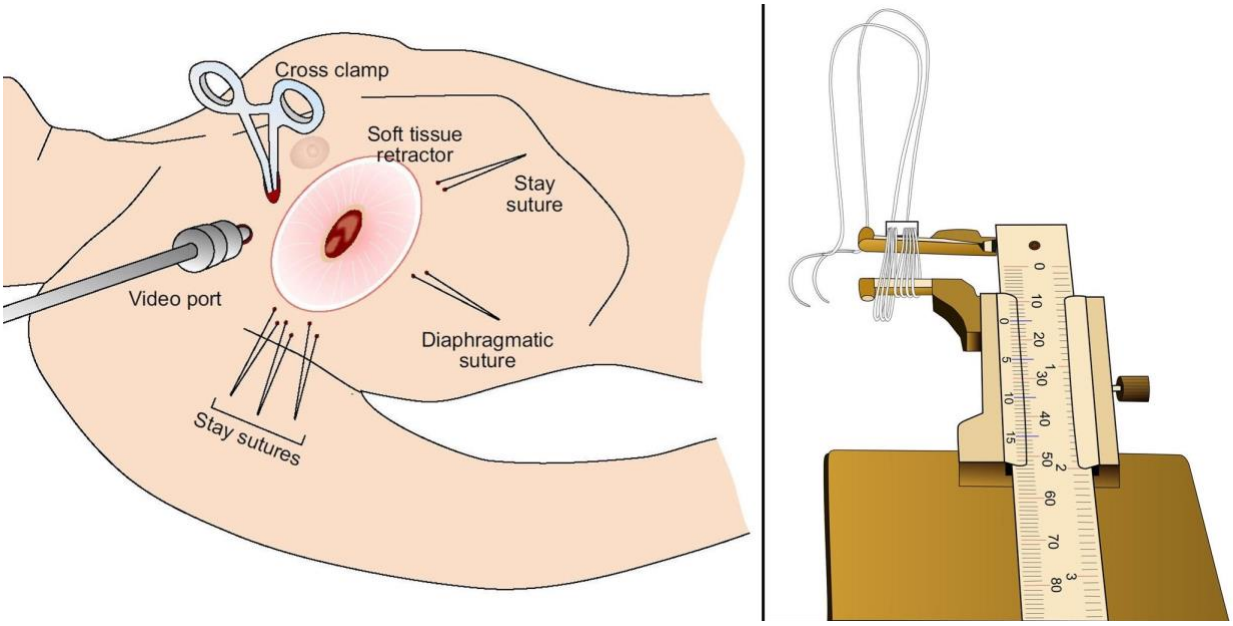
Results: 112 patients were included in this study with a maximum follow-up of 7 years. In-hospital mortality occurred in 1 patient (0.9%) and 2 additional post-discharge deaths occurred, but were unrelated to the MV repair. Residual ≤mild MR was present in 101/103 patients with an echocardiogram (98.1%) and 3 patients required reintervention of the MV (2.7%) during the 5.3 year study period.

Conclusion: We present our single-center series of MIMVr utilizing a novel approach to neochord creation allowing for a standardized approach to MVr, creating a new plane of coaptation of the MV by aligning the entire length of the repaired leaflet. The technique is successful as it creates a new plane of coaptation of the MV by aligning the entire length of the repaired leaflet. The technique has resulted in low rates of mortality, morbidity, and durability of repairs at mid-term follow-up.

References:

[1]EL-Andari R, Kang J, Bozso S, Moon M, Nagendran J. Minimally invasive complex neochordal reconstruction for mitral valve regurgitation. JTCVS Tech 2024;27:91–5.

Figure:


Cross clamp
Soft tissue retractor
Stay suture
Video port
Diaphragmatic suture
Stay sutures

# Toward a Technology-Integrated Clinical Framework for Management of Deep Neck Space Infections: A Scoping Review

Farah Ali[1], Shanna Yeung[1], Fatemeh Ramazani[1], Jonathan Yip[1], Ashley Hinther[1,2]

[1]Section of Otolaryngology- Head and Neck Surgery, Department of Surgery, University of Calgary, [2]Ohlson Research Initiative, University of Calgary

Introduction: Deep neck space infections (DNSIs) are serious conditions associated with life-threatening complications, including airway compromise, sepsis, and mediastinitis. Despite their clinical significance, management remains variable, particularly regarding surgical timing, procedural selection, and airway strategy.

Methods: This study presents a scoping review of current evidence to inform a standardized, evidence-based clinical pathway incorporating emerging technologies and minimally invasive approaches to DNSI management. A systematic search of OVID MEDLINE, EMBASE, Scopus, and the Cochrane Library was conducted, focusing on primary research papers discussing management strategies for DNSIs. Interventions of interest included antibiotic therapy, corticosteroid use, timing of dental extraction, thresholds for operative intervention, image-guided drainage techniques, intraoperative airway management strategies, and postoperative care optimization.

Results: Findings were synthesized to identify key decision points in care while highlighting opportunities for innovation in procedural management. Evidence supports empiric broad-spectrum antibiotics with de-escalation based on culture data. Ultrasound-guided drainage, as a minimally invasive alternative to incision and drainage, was associated with shorter hospital stays without increased recurrence in appropriately selected patients. Concurrent dental extraction in odontogenic infections improves outcomes and reduces recurrence, supporting integrated surgical management. Patient stratification based on disease severity and anatomical involvement remains central to management. Patients with multi-space infections, significant comorbidities, or airway compromise benefit from early surgical intervention, while small, localized infections may be managed non-operatively. Advances in airway management, including fiberoptic and other advanced intubation techniques**,** play a critical role in safely managing anatomically complex infections. Based on these findings, we propose a stepwise, technology-integrated clinical framework that incorporates disease severity, anatomical considerations, and procedural options to guide management decisions. However, gaps remain in optimizing intraoperative irrigation strategies and postoperative drain management.

Conclusion: In conclusion, this review supports the development of a standardized, innovation-informed approach to DNSI care, integrating minimally invasive and technology-enabled techniques to improve patient outcomes and reduce practice variability.

# Device Dependent Variability in White-to-White and Anterior Chamber Depth and its Impact on ICL Sizing

Ameen Alizada[1], Najib Elkadri[1], Ahmed Abdel-Sayyed[1], Marcella LaBelle, Ahmed Al-Ghoul[2]

[1]Cumming School of Medicine, [2]Section of Ophthalmology, Department of Surgery, University of Calgary, Calgary, AB

**Purpose**: To compare white-to-white (WTW) and anterior chamber depth (ACD) measurements from IOLMaster 700, Argos, Pentacam AXL, Schwind topography, a digital caliper and to evaluate their effects on the STAAR Online Calculation and Ordering System (OCOS) recommended implantable collamer lens (ICL) size and agreement with the surgeon's implanted size.

**Methods:** Retrospective cross-sectional series of ICL candidates managed by one surgeon Jan 2022 to Jan 2025. For each eye, WTW and ACD were recorded from multiple devices. OCOS sizes were simulated by swapping either WTW or ACD from each device while holding the other at the clinic composite standard (WTW=[IOLMaster+Argos]/2 - 0.34375; ACD=[Schwind+Pentacam]/2) and keeping all nonbiometric inputs constant. We compared device measurements with linear mixed effects models with a random intercept for eye and Tukey adjusted post hoc tests and reported absolute differences. Agreement with the implanted size was summarized as proportions with 95% confidence intervals.

**Results:** We analyzed 224 eyes with a mean age of 33.8 (20-50) years. Mean WTW and ACD measurements were significantly different between devices ($P < 0.001$). Mean WTW was largest in the IOLMaster (12.16 ± 0.37 mm) and smallest with a digital caliper (11.81 ± 0.37 mm) and the clinic composite (11.73 ± 0.35 mm). Matching simulated and implanted ICL size was highest with caliper WTW at 92.1% and lowest with IOLMaster WTW at 40.8%. The highest ICL size agreement was between Argos and Schwind (84.7%), whereas Schwind disagreed with the digital caliper in 52.2% of eyes. ACD swaps favored the Pentacam at 85.6% agreement, while being lowest in Argos at 61.9%. Argos showed the deepest ACD (3.82 ± 0.25 mm).

**Conclusion:** IOLMaster 700, Argos, Pentacam AXL, and Schwind produced systematically different WTW and ACD values and are not interchangeable for ICL sizing. Pairing caliper-derived WTW with tomography-derived ACD Pentacam AXL or Schwind yielded the highest exact match to the implanted length in this cohort and may increase target-vault rates.

**Title:** Ahead of the Curve: MAUDE Report Analysis of Neurosurgery and Otolaryngology Stereotaxic Device Adverse Events

**Authors:** Yousef Darwish, Barak Almarzouq, Ayman Mohamed, Abdul Al-Shawa, Dr. Jonathan Yip

**Importance:** Neurosurgery and otolaryngology surgeons both rely on stereotaxic instrumentation for guidance when performing surgeries involving the skull and sinuses. Failure of these tools can lead to various complications, including cerebrospinal fluid leaks, decreased vision of the patient post-surgery, and in extreme cases death.

**Objective:** This study aims to explore the relationship between stereotaxic equipment failure and surgical complications using the MAUDE database.

**Methods:**

- **Data Sources:** All the reports were collected from the Manufacturer and User Facility Device Experience (MAUDE) database
- **Inclusion Criteria:** Reports with the product codes PGW and HAW, which are associated with stereotaxic instruments, from the years 2014-2024 were collected. Duplicate reports were removed. Reports associated with spine only procedures were excluded.
- **Data Extraction:** A large language model was used to classify all the reports into the appropriate category. The language model was authenticated by manually reviewing 400 reports and comparing them to the results from the language model.

**Results:** After exclusion and deduplication, 29,375 reports from the years 2014-2024 were collected. 841 reports were associated with a serious adverse event, including deaths, CSF leaks and hemorrhaging. Of these, 667 resulted in serious harm and 53 in deaths. Bleeding was the most common complication, followed by nerve injury and then CSF leaks. Due to the nature of the database, reports were not standardized; 233 of the serious adverse events reports were internally contradictory, and so could not be appropriately categorized.

**Conclusions:** Of all the adverse events reported from 2014-2024, only 2.9% led to clinically significant complications, the most common being bleeding. Notably, this study highlighted the lack of standardization for reporting adverse events associated with stereotaxic equipment and the poor quality of currently existing databases.

**Learning Objectives**:

By the end of this presentation the audience will be able to:

1. Understand the association between stereotaxic device failure and surgical complications
2. Identify which device errors are more likely to lead to complications
3. Identify the most common complications of stereotaxic device failure
4. Recognize current challenges with reporting stereotaxic device adverse events

# Accuracy of Large Language Models in Performing Clinical Calculations Relevant to Neurosurgery, Neurology, and Neurocritical Care

Marcus A. Doyle[1], Austin A. Barr[1], Noam H. Sander[1], Raphael Goldman-Pham[1], Robert C[1]. Rozman[2]

[1]Cumming School of Medicine, University of Calgary, Calgary, AB, Canada; [2]Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada

Introduction:
Online clinical calculators synthesize patient-specific variables into standardized scores to inform clinical decision making. These calculators are particularly useful in neurosurgery, neurology, and neurocritical care for risk stratification, prognosis, and treatment selection [1]. While tools such as MDCalc improve accessibility, manual data entry remains time-consuming and error-prone, prompting interest in large language models (LLMs) for automated calculations [2]. As a result, large language models (LLMs) have been proposed as tools to automate clinical calculations. However, the accuracy and comparative performance between LLMs have not been well-characterized. In this study, we evaluate three widely used LLMs: ChatGPT, OpenEvidence, and Gemini, across 135 clinical calculators relevant to neurosurgery, neurology, and neurocritical care.

Methods:
We evaluated three LLMs, ChatGPT 5.2, OpenEvidence, and Gemini 3, across 135 validated neuro-relevant clinical score calculators. For each calculator, three standardized prompts containing distinct combinations-of-variables were input into each LLM. Outputs were compared with MDCalc reference values and accuracy was defined as the proportion of correct outputs across aggregate trials. Pairwise comparisons between each model's overall accuracy were performed using two-sided Wilcoxon rank-sum tests.

Results:
Overall accuracy differed across models: ChatGPT achieved 70.37% accuracy (258/405), Gemini 64.69% (262/405), and OpenEvidence 60.74% (246/405). ChatGPT significantly outperformed OpenEvidence ($p = 0.012$), while differences between ChatGPT and Gemini ($p = 0.171$) and between Gemini and OpenEvidence ($p = 0.252$) were not statistically significant.

Conclusions:
Despite growing clinical adoption [3], LLMs demonstrate inconsistent performance on clinical calculations, with error rates posing meaningful risk in care settings. At present, LLMs are not reliable substitutes for validated clinical calculators and should not be used for automated clinical computation. Further development is required to improve the accuracy of these LLMs in clinical calculations before application to patient care.

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# Revision Interposition Arthroplasty with AlloDerm for Persistent Thumb Carpometacarpal Pain Following TightRope Suspensionplasty: A Case Report

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Introduction: Thumb carpometacarpal (CMC) arthritis is a common source of pain and disability. Trapeziectomy with ligament reconstruction and tendon interposition remains a standard surgical option, while suture-button suspensionplasty provides a tendon-sparing alternative with earlier mobilization. Although outcomes are generally similar, some patients experience persistent pain despite maintaining mechanical stability. This report discusses the use of AlloDerm interposition arthroplasty as a revision approach for activity-related pain following TightRope suspensionplasty.

Methods: A 48-year-old female police officer with advanced thumb CMC arthritis underwent trapeziectomy with TightRope suspensionplasty. Despite initial recovery, she developed persistent pain during forceful pinch and grip, impairing occupational tasks such as firearm use. Clinical examination and imaging showed stable alignment without metacarpal subsidence. A diagnostic local anesthetic injection localized the pain to the intermetacarpal space between the first and second digits, indicating a peripheral soft-tissue pain source. Revision surgery involved removing the suture-button construct and placing an AlloDerm graft between the first and second metacarpals to serve as an interposition spacer.

Results: Postoperatively, the patient underwent structured rehabilitation with splinting and progressive strengthening. At one month, she reported a significant reduction in pain during high-load activities. By three months, she had returned to full occupational duties, including firearms training. Functional outcomes improved, with Upper Extremity Functional Index scores increasing from 34/100 preoperatively to 75/100 postoperatively. Grip strength improved to 24 kg (contralateral 32 kg), and key pinch strength reached 3.6 kg (contralateral 7.2 kg). Residual symptoms included mild dorsal thumb numbness and minor metacarpophalangeal hyperextension during forceful pinch.

Conclusion: AlloDerm interposition arthroplasty is a viable salvage option for patients with persistent, load-dependent pain following TightRope suspensionplasty, even when there is no structural instability. In this case, biologic interposition effectively reduced pain, restored function, and allowed for a return to high-demand occupational activities. This technique may be especially useful for patients who require pain-free forceful pinch and grip. Further studies are necessary to assess the long-term outcomes of AlloDerm use in revision CMC arthroplasty.

# Use of Botox Injections for Functional Popliteal Artery Entrapment Syndrome: A Single Centre Retrospective Review

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Introduction: Functional Popliteal Artery Entrapment Syndrome (FPAES) is a rare condition in which the popliteal artery is compressed by overlying hypertrophied gastrocnemius muscles, causing exercise-induced claudication pain in young, otherwise healthy individuals. These patients are often athletes who become disabled due to claudication. Conventional treatment involves surgical debulking of prominent calf muscles compressing the popliteal artery, which is invasive and associated with risks such as recurrence, hematomas, infection, and the need for revision procedures. In 2015, a novel, non-invasive method for treating FPAES was proposed: the injection of Botulinum toxin A (BTX-A) into hypertrophic leg muscles to induce atrophy and thereby reduce functional compression of the artery. Since then, only a handful of studies have been published on this topic suggesting a lack of data on the matter. The objective of this study was to evaluate the safety and efficacy of ultrasound guided Botox injections conducted at the Peter Lougheed Centre for treatment of FPAES while also outlining the protocol for BTX-A injections used at our centre.

Methods: This study was a retrospective chart review of patients who underwent Botox injections for FPAES from January 1, 2015-December 31, 2023. Patient consultation notes and progress notes recorded on AHS network computers were used as sources of data. After deidentifying patient files following AHS policies, patient charts were selected according to our inclusion and exclusion criteria. Data extraction was completed on Excel where we recorded demographic information and clinical outcomes associated with BTX-A injections. This involved recording subjective symptom improvement as well as objective changes in peak systolic velocities recorded immediately post injection and in follow-up. Finally, our center's protocol for treatment of FPAES was elucidated via review of all patient notes from the Interventional Radiologist at the time of each injection.

Results: Twenty-nine patients were included in the study (Table 1). Of these, 84% showed a reduction in their post-intervention peak systolic velocity on plantarflexion with mid-term improvement noted at approximately 7–8 months post-treatment. 88% (n=27) of patients reported improvement in clinical symptoms resulting in 79% (n=24) achieving a return to sport and/or work (Table 2). Three patients reported a worsening of symptoms post-injection, and one patient suffered a transient foot drop with no other major complications recorded. The injection protocol used in our centre involves patients receiving 50 units of Botox into each of the heads of the gastrocnemius muscle of the affected limb under ultrasound guidance.

Conclusions: This study shows support for the use of Botox injections for FPAES with greater than 80% of patients having objective and subjective improvement post-procedure and only one patient experiencing a mild complication. Given this safety and efficacy, further research is required to determine the optimal number and timing of sessions as well as long term outcomes.

Tables:

Table 1. Demographic and Baseline Characteristics

| Variables | All Subjects (n = 29) | Male (n= 11) | Female (n =18) | P - Value |
|---|---|---|---|---|
| Age | 32.1 ± 11.9 | 32.8 ± 12.2 | 31.7 ± 12.1 | 0.8061 |
| Affected leg | | | | |
| Both leg | 28 | 10 | 18 | 0.1930 |
| Right leg | 1 | 1 | 0 | |
| U/S (cm/s) | | | | |
| Neutral Left Leg | 73.2 ± 18.4 | 76.5. ± 20.4 | 71.2 ± 17.4 | 0.4558 |
| Plantarflexion Left Leg | 222.2 ± 134.6 | 195.7 ± 139.1 | 238.3 ± 133.1 | 0.4180 |
| Dorsiflexion Left Leg | 107.8 ± 33.4 (23) | 114.1 ± 43.4 (10) | 103.0 ± 24.0 (13) | 0.4421 |
| Neutral Right Leg | 80.3 ± 18.4 | 80.4 ± 18.6 | 80.3 ± 18.8 | 0.9905 |
| Plantarflexion Right Leg | 245.5 ± 146.3 | 208.1 ± 153.0 | 268.4 ± 141.4 | 0.2895 |
| Dorsiflexion Right Leg | 127.6. ± 49.2 (23) | 133.1 ± 62.2 (10) | 123.4 ± 38.5 (13) | 0.6492 |

Table 2. Objective and Subjective Outcomes of BTX-A Injection Immediately Following Treatment and in Follow-up

| Variables | All Subjects (n =29) | Male (n=11) | Female (n=18) | P-Value |
|---|---|---|---|---|
| Total Treatments # | 4.3 ± 3.8 | 5.6 ± 4.9 | 3.4 ± 2.8 | 0.1971 |
| Last Treatment: | | | | |
| Time_to _Last_Treatment (d) | 199.1 ± 132.8 (28) | 195.8 ± 119.2 | 201.3 ± 153.7 (17) | 0.9211 |
| Plantarflexion Left (cm/s) | 114.6 ± 46.0 (28) | 122.3 ± 56.8 | 109.7 ± 38.5 (17) | 0.4902 |
| Plantarflexion Right (cm/s) | 114.5 ± 46.2 (28) | 115.0 ± 49.2 | 114.2 ± 45.8 (17) | 0.9669 |
| Total Follow Up # | 4.4 ± 3.9 (19) | 5.4 ±5.4 | 3.7 ± 2.7 | 0.3025 |
| Last Follow Up: | | | | |
| Time from last injection to FU (d) | 140.4 ± 95.3 (22) | 179.5 ± 98.9 (8) | 118.1 ± 89.0 (14) | 0.1499 |
| Neutral Left (cm/s) | 69.8 ± 13.5 (27) | 71.4 ± 11.8 (10) | 68.8 ± 14.7 (17) | 0.6420 |
| Neutral Right (cm/s) | 74.8 ± 14.1 (27) | 74.5± 11.4 (10) | 75.0 ± 15.8 (17) | 0.9231 |
| Plantarflexion Left (cm/s) | 159.9 ± 97.7 (27) | 144.9 ± 66.9 10) | 168.7± 123.0 (17) | 0.5513 |
| Plantarflexion Right (cm/s) | 163.1 ± 99.5 (27) | 127.6 ± 38.1 (10) | 183.9 ± 118.4 (17) | 0.0847 |
| Worsening (n=28): | | | | |
| Yes | 3 | 1 | 2 | 0.8232 |
| No | 25 | 10 | 15 | |
| Reduction in Symptomatology (n=27): | | | | |
| Yes | 24 | 10 | 14 | 0.1588 |
| No | 3 | 0 | 3 | |
| Return to sport and/or work (n=24) | | | | |
| Yes | 19 | 10 | 9 | 0.0337 |
| No | 5 | 0 | 5 | |
| Complications: | | | | |
| Yes | 1 | 0 | 1 | 0.4263 |
| None | 28 | 11 | 17 | |

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| Complications: | | | | |
| Yes | 1 | 0 | 1 | 0.4263 |
| None | 28 | 11 | 17 | |

# WALANT Thumb CMC Joint Denervation Under Field Sterility: A Case Report and Description of Technique

Faye Graff[1], Alex Platt[2,3], Brett Ponich[2,3], Aaron Knox[2,3]

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**Introduction:** Thumb carpometacarpal (CMC) joint osteoarthritis (OA) is a common source of hand pain and functional limitation, often interfering with activities of daily living. Selective CMC joint denervation has emerged as a less invasive, joint-preserving surgical option that offers faster recovery compared to traditional procedures. Wide-awake local anesthesia no tourniquet (WALANT) has gained increasing adoption for the treatment of hand pathologies. We describe the use of WALANT under field sterility to perform selective thumb CMC denervation.

**Methods:** An 81-year-old female with symptomatic Eaton stage II thumb CMC OA, refractory to conservative treatment, underwent selective CMC joint denervation using WALANT in a minor surgery setting. The joint was approached through a single volar-radial incision. Denervation targeted the articular branches of the dorsal radial sensory nerve, the lateral antebrachial cutaneous nerve, and sensory contributions from the thenar and palmar cutaneous branches of the median nerve.

**Results:** The operation lasted approximately 30 minutes and was well tolerated by the patient, with no intraoperative side effects or discomfort. Early postoperative follow-up at 2 weeks and 1 month demonstrated no complications and high patient satisfaction.

**Conclusions:** Selective thumb CMC denervation performed under WALANT with field sterility is a safe and efficient option for managing refractory CMC osteoarthritis. Denervation preserves joint anatomy to maintain future surgical options, such as trapeziectomy, while minimizing recovery time. WALANT eliminates the need for general anesthesia, reduces perioperative risk and cost, and enables continuous intraoperative communication with the patient, improving procedural efficiency and the overall patient experience.

# Competence by Design Strains Surgical Residency Training Programs

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**Introduction:** Since its introduction into Canadian Post-Graduate Medical Education, Competence by Design (CBD) has shifted training from time-based to the achievement of defined competencies through Entrustable Professional Activities (EPAs). Studies have raised concerns about CBD since its launch, including increased workloads, completing EPAs, and effects on stress and wellness. However, its impact on surgical residents and attending surgeons remains poorly characterized. This study examined how CBD affects surgical trainees and staff, with a focus on burnout and wellness.

**Methods:** A cross-sectional survey was distributed electronically to surgical residents and attending surgeons across multiple specialties at the University of Calgary between July and September 2024. Burnout was assessed using the Maslach Burnout Inventory (MBI) supplemented by a single self-reported question assessing perceived burnout. Emotional/physical, occupational, and intellectual/educational wellness were evaluated using Likert-scale items.

**Results:** 62 surgeons and 49 residents completed the survey. Self-reported burnout was higher among residents than surgeons (67% vs 38%), a finding confirmed by the MBI (29.6% vs 9.3%). Most residents (75%) attributed their burnout to CBD. Residents experienced greater negative effects on emotional wellness, reporting higher stress, sleep disruption, and interference with physical health related to EPA tasks. Surgeons were more likely than residents to perceive CBD as motivating (68% vs 26%) and relationship-building (33% vs 6%). Few participants believed CBD improved surgical skills, autonomy, or readiness for practice. Overall, residents reported a greater negative impact of CBD compared to surgeons.

**Conclusions:** Though CBD aims to prepare residents for independent practice, its implementation has introduced challenges affecting residents' well-being and satisfaction at the University of Calgary. Our findings demonstrate the need for targeted programmatic adjustments to better support trainee wellness and meaningful competency development.

# Venous Thromboembolism Prophylaxis in Adult Burn Patients: Development of a Burn-Specific Protocol

Mo Hamour, Omar Barasain, Alexis Armour

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Introduction: Venous thromboembolism (VTE) is a recognized complication in adult burn patients, driven by endothelial injury, systemic inflammation, immobility, and repeated operative intervention. Despite this, prophylaxis strategies remain inconsistent, with variability in anticoagulant dosing, monitoring, and integration of mechanical prevention. Existing recommendations are largely extrapolated from non-burn populations, with limited burn-specific standardization. This study aimed to synthesize contemporary evidence and develop a practical, evidence-informed VTE prophylaxis protocol for adult burn patients.

Methods: A structured review of international guidelines, consensus statements, and primary burn-specific studies was conducted. Data were extracted regarding VTE incidence, risk factors, pharmacologic strategies, anti-factor Xa monitoring, and mechanical prophylaxis. Study periods were evaluated to assess the temporal relevance of the evidence base. Based on these findings, a burn-specific inpatient VTE prophylaxis protocol was developed, emphasizing simplicity, clinical applicability, and alignment with current evidence.

Results: Symptomatic VTE incidence in retrospective burn cohorts ranges from approximately 0.25% to 6%, with higher rates reported in prospective screening studies, suggesting under-recognition of true thrombotic burden. Consistent risk factors include increased total body surface area, lower extremity burns, advanced age, inhalation injury, prolonged ICU stay, central venous catheterization, infection, and repeated operative intervention. Low molecular weight heparin (LMWH), particularly enoxaparin, is consistently favored over unfractionated heparin. Multiple burn-specific studies demonstrate that standard dosing (30 mg twice daily) frequently results in subtherapeutic anti-factor Xa levels, particularly in patients with larger burns or elevated body mass index. Escalated dosing (e.g., 40 mg twice daily) or weight-based strategies improve attainment of prophylactic anti-factor Xa targets (0.1–0.3 IU/mL), although evidence linking this to reduced VTE events remains limited. Mechanical prophylaxis is recommended as adjunctive therapy or when anticoagulation is contraindicated. Review of study periods (2002–2023) demonstrated that much of the dosing literature predates current clinical practice. These findings were translated into a standardized protocol incorporating universal prophylaxis, risk stratification, LMWH-based dosing with escalation in high-risk patients, selective anti-factor Xa monitoring, and adjunctive mechanical prophylaxis.

Conclusion: Adult burn patients represent a high-risk population for VTE, with consistent evidence supporting LMWH-based prophylaxis and dose optimization in higher-risk patients. This study extends beyond literature synthesis by developing a clinically applicable, burn-specific VTE prophylaxis protocol. While current evidence supports protocol implementation, further prospective evaluation is needed to assess its impact on clinical outcomes.

Table:

| Domain | Key Evidence | Protocol Implementation |
|---|---|---|
| VTE Risk | Likely underestimated; higher in severe burns | Universal prophylaxis with early assessment |
| Risk factors | TBSA ≥ 20%, ICU stay, CVC, obesity, OR procedures | Define high-risk subgroup |
| Pharmacologic Agent | LMWH superior to UFH | Enoxaparin first-line |
| Standard dosing | 30 mg BID often subtherapeutic | 40 mg BID baseline |
| High-risk patients | Severe burns, obesity → underdosing | Escalation or weight-based dosing |
| Anti-Xa Monitoring | Subtherapeutic levels common | Selective monitoring in high-risk patients |
| Mechanical Prophylaxis | Effective adjunct | Use when feasible or if anticoagulation contraindicated |
| Evidence Gaps | Limited modern outcome data | Protocol designed for future evaluation |

# Beyond the Curriculum: A Systematic Review of Supplementary Plastic Surgery Education in Undergraduate Medical Training

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[3]Department of Surgery, University of Calgary, Calgary, Alberta, Canada

**Introduction**: Plastic surgery is a uniquely diverse and technically complex specialty that encompasses many different anatomical regions, disease processes, and surgical techniques, spanning reconstructive and aesthetic domains. Despite this breadth, it remains underrepresented in undergraduate medical curricula worldwide, leaving students with critical gaps in knowledge and skills surrounding these essential concepts.[1] Lack of exposure to plastic surgery also creates barriers to attracting diverse talent to the field and enables inaccurate perceptions of the specialty to form and grow.[2] These misconceptions carry downstream consequences for referral patterns, patient care, and residency recruitment.[3] In response, supplementary educational initiatives specific to plastic surgery have emerged to address these gaps. However, the structure, scope, and impact of these interventions have not been systematically characterized.

**Objective**: To systematically analyze supplementary plastic surgery education strategies for undergraduate medical students and evaluate their impact on knowledge, skills, and attitudes towards the specialty.

**Methods**: We searched Ovid MEDLINE, Embase, Scopus, and Web of Science from inception through April 15, 2026. Reports published between 2005 and 2025 that evaluated supplementary plastic surgery educational interventions targeting undergraduate medical students were included. Independent reviewers screened search results and extracted data following PRISMA guidelines. Study quality was assessed using the Medical Education Research Study Quality Instrument (MERSQI), and a systematic review with narrative synthesis was performed.

**Results**: Twenty-nine studies that met inclusion criteria were identified and reviewed. The mean MERSQI score was 10.6 (SD 2.28; range 6.5–14.5), indicating moderate research quality across the included literature. Educational initiatives were predominantly multimodal. Didactic teaching was the most common incorporated modality (72.4%), followed by hands-on or simulation-based training (62.0%), digital/asynchronous learning (31.0%), and formal mentorship programs (10.3%). Interventions ranged from single-day workshops and conferences to longitudinal programs and dedicated electives for students without home residency programs.

Supplementary interventions consistently improved knowledge, with significant gains in examination scores and self-reported understanding. Procedural skills also improved significantly, with increased confidence and objective performance in suturing, flap design, and

*These authors contributed equally to this work.

other common procedures. Additionally, attitudes towards the field of plastic surgery were enhanced, as evidenced by a better understanding of the specialty's scope, reduced misconceptions, and increased career interest. Twenty-seven of 29 studies (93.1%) reported an overall positive effect, and satisfaction was uniformly high across modalities.

**Conclusion**: Supplementary plastic surgery education is effective across diverse formats and consistently improves student knowledge, skills, and perceptions. These findings support the expansion and standardization of supplementary initiatives to complement limited formal curricular exposure. Future research should prioritize controlled study designs, validated outcome instruments, longer-term follow-up, and multi-institutional collaboration to strengthen the evidence base.

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# Mass Spectrometry-Derived Tissue and Circulating Proteomic Biomarkers in Thoracic Aortic Disease: A Systematic Review

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Introduction: Thoracic aortic diseases are major contributors to cardiovascular morbidity and mortality worldwide. Currently, these conditions are unlikely to be diagnosed until an acute event occurs, creating an urgent need for non-invasive tools for early detection. Proteomics have allowed the identification of biomarkers associated with thoracic aortic aneurysms (TAA's) and dissections (TAD's), however, biomarker studies in these conditions remain limited, with current literature characterized by heterogeneous disease subtypes and poor replication across studies.

Methods: We searched Ovid MEDLINE, EMBASE, PubMed, Web of Science, and Scopus from inception through April 4, 2026, for studies reporting mass spectrometry (MS)-based proteomic biomarkers in thoracic aortic diseases. Studies involving thoracic aortic phenotypes were screened according to predefined eligibility criteria. Data were extracted on study design, disease subtype, sample source, proteomic platform, validation methods and reported biomarkers. Findings were synthesized and grouped into major mechanistic domains, including metabolic/mitochondrial stress, extracellular matrix (ECM)/ transforming growth factor beta (TGF-beta) remodeling, vascular smooth muscle cell (VSMC) contractile/cytoskeletal injury, inflammation/neutrophil extracellular trap formation (NETosis)/coagulation, endothelial signaling/endothelial-to-mesenchymal transition (EndMT), and circulating plasma protein signatures.

Results: The study search resulted in 1537 studies, which were reduced to 31 studies following abstract and full-text screening. Of the 31 included studies, 30 were classifiable into six predefined mechanistic domains and eligible for study-level directional analysis: inflammation/acute-phase/NETosis/coagulation (n = 7), ECM/TGF-beta remodeling (n = 7), Metabolic/mitochondrial stress (n = 5), endothelial/developmental signaling/EndMT (n = 5), VSMC contractile/cytoskeletal injury (n = 4), and circulating carrier/liver-secreted plasma proteins (n = 2). After excluding 3 studies with mixed within-domain directionality, an exact two-sided binomial analysis of 27 non-mixed study-level assignments was undertaken.

The inflammation/acute-phase/NETosis/coagulation domain demonstrated a statistically consistent directional signal, with biomarker upregulation in 7 of 7 studies (100.0%; 95% CI 59.0-100.0; p = 0.0156). ECM/TGF-beta remodeling was observed in 5 of 7 studies (71.4%; 95% CI 29.0-96.3; p = 0.4531), as did endothelial/developmental signaling/EndMT markers, with 3 of 4 non-mixed studies (75.0%; 95% CI 19.4-99.4; p = 0.6250) showing decreased biomarker load, and 1 study showing mixed results. Circulating carrier/liver-secreted plasma proteins showed downregulation in 2 of 2 studies (100.0%; 95% CI 15.8-100.0; p = 0.5000). Metabolic/mitochondrial stress showed no dominant direction, with biomarker upregulation in 2 of 4 non-mixed studies (50.0%; 95% CI 6.8-93.2; p = 1.000) and downregulation in the remaining 2 studies, with 1 study yielding mixed results. VSMC contractile/cytoskeletal injury was similarly heterogeneous, with biomarker upregulation in 2 of 3 non-mixed studies (66.7%; 95% CI 9.4-99.2; p = 1.000) and downregulation in 1 of 3 (33.3%); 1 study was mixed. The inflammatory markers CRP (n=3) and SAA1 (n=3) were the most recurrent across studies.

Conclusion: Current literature indicates proteomic biomarkers identified through MS-based methods in thoracic aortic diseases show a consistent signal within inflammatory pathways, particularly acute-phase NETosis and coagulation-related domains. Larger standardized prospective studies are needed to validate biomarkers for early detection and risk stratification.

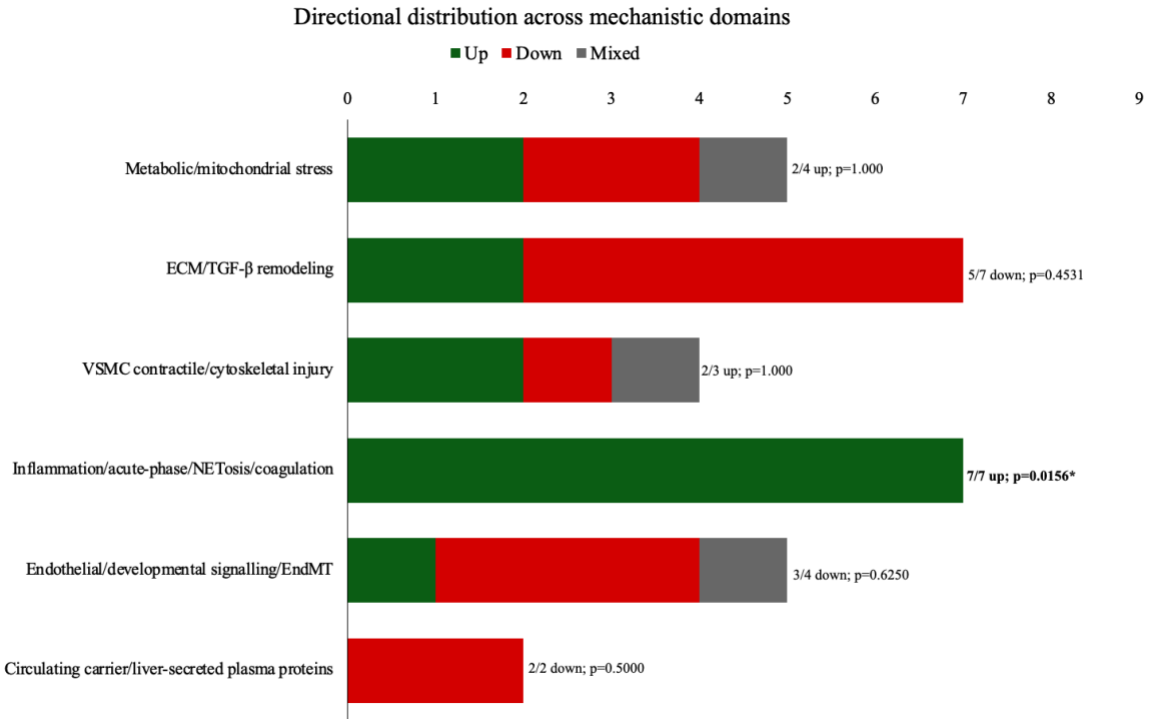


**Figure 1.** Study-level directional distribution of proteomic biomarker findings across six mechanistic domains in thoracic aortic disease. Bars represent the number of studies within each domain classified as predominantly upregulated, downregulated, or mixed. Exact two-sided binomial tests were applied to non-mixed studies only. The inflammation/acute-phase/NETosis/coagulation domain was the only domain to demonstrate a statistically consistent directional signal. *$p < 0.05$ by exact two-sided binomial test.

# Screening for anal intraepithelial neoplasia and anal cancer in Tenwek Hospital in Kenya

A Leon Hassinger, S Muncner, MA Dykstra

## Introduction:

Kenya bears a high Human Immunodeficiency Virus (HIV) burden with 1.38 million people living with HIV (PLHIV) as of 2024[1]. PLHIV face high risk of anal squamous cell carcinoma, with incidence rates 19 to 30 times higher than the general population[2]. Oncogenic human papillomavirus (HPV) is the primary cause of anal squamous cell carcinoma (SCC), which typically develops from precancerous lesions known as Anal Intraepithelial Neoplasia (AIN)[3]. Early detection of AIN through anal cytology or Anal Pap smears allows for intervention before disease progression to invasive SCC. This screening strategy, followed by High-Resolution Anoscopy (HRA) for abnormal results, is the standard for preventing anal cancer in high-risk populations. While Kenya's 2019 HPV vaccination program targets girls, it excludes boys and high-risk groups like MSM[4]. Moreover, while cervical cancer screening is available in Kenya, a data gap exists regarding Anal Intraepithelial Neoplasia (AIN) prevalence, particularly in rural populations [5]. This mirrors a regional lack of standardized screening protocols and data across sub-Saharan Africa[5]. Thus, the primary objective of this study is to determine the baseline prevalence of AIN (low- and high- grade) and anal carcinoma among patients at Tenwek Hospital, stratified by HIV status and HPV immunization. This will inform the implementation of a HPV vaccination program for both men and women, and strengthen the screening, diagnostic and treatment pathways for AIN and anal SCC in Kenya.

## Methods:

This longitudinal study will begin with a pilot phase of 1-2 years. This is a single centre, prospective, cohort study that will be conducted at Tenwek Level 5 Teaching and Referral Mission Hospital in Bomet County, Kenya. A sample size of 300 adult patients undergoing anal Papanicolaou (pap)-smear will be enrolled from June 1, 2027 - May 30, 2029. Clinical data will be collected for all patients undergoing pap-smear from physical and electronic medical records, including, but not limited to: demographics, social history (including smoking and sexual history), HPV immunization status, HIV status, CD4+ count (if available), and treatment status. Results of cytology will be analysed and stratified by the demographic, social and clinical factors collected above, thereby providing baseline prevalence of AIN and anal SCC in Kenya.

## Results:

No results are currently available as this project is in its proposal stage and is envisioned to be the beginning of a long-term, multi-year partnership between our centre and Tenwek Hospital in Kenya. The primary investigator has visited Tenwek Hospital and through consultation with local champions has identified the need for this project to investigate AIN and anal SCC in Kenya. Our goal is to improve the diagnostic and treatment pathway for those with abnormal results to receive high-Resolution Anoscopy (HRA) and biopsy.

Conclusions:

This project will be the first to address an overlooked but crucial global health need by establishing the first local data on AIN and anal SCC at Tenwek Hospital in Kenya. As a multi-year initiative, we aim to produce actionable evidence to inform Kenyan national health policy regarding gender-neutral HPV vaccination and routine screening for high-risk populations.

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# Mapping pediatric general surgery training in low and middle-income countries: a scoping review

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Introduction: Children in low and middle-income countries (LMICs) face a profound disparity in access to essential surgical care. Research indicates that up to 85 percent of children will require at least one surgical intervention before the age of 15. Despite this significant need, the availability of trained pediatric surgeons is critically limited. For instance, in sub-Saharan Africa, approximately 100 pediatric surgeons currently serve more than 300 million children, a demographic expected to reach 500 million by 2050. This workforce crisis creates severe gaps in care and necessitates the development of effective, scalable training models. This scoping review systematically maps existing literature to identify barriers, facilitators, and educational strategies that can be integrated into surgical practice to enhance healthcare equity.

Methods: A scoping review methodology was employed, incorporating searches of seven electronic databases: MEDLINE, Embase, Global Health, CINAHL, Scopus, Web of Science, and the Cochrane Library. The search, conducted in July 2025, identified 6,213 records. After duplicates were removed, 3,791 unique studies were screened using the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews) methodology. Screening was performed in duplicate with a Cohen's kappa of 0.44. Data extraction focused on training modalities, instructional approaches, evaluation methods, and contextual factors. Thematic analysis was used to synthesize findings across various geographic regions.

Results: Fifty studies met the inclusion criteria. Most identified educational initiatives were descriptive or program evaluations, including residency programs (7), simulation-based modules (4), and specialized curricula (4). Training delivery included in-person (20), hybrid (7), and asynchronous (4) models. Specific successful strategies included low-bandwidth videoconferencing for instruction in South Africa, DVD-based seminars in East and Central Africa, and the establishment of regional training hubs in Tanzania. Capacity-building efforts prioritized training the trainee models (13) and infrastructure development (9). Key barriers identified were limited faculty availability, inadequate infrastructure, and a lack of standardized curricula. Facilitators included international partnerships, structured mentorship, and institutional support for protected teaching time. While many programs reported gains in trainee confidence, objective assessments of long-term clinical outcomes were rarely documented.

Conclusions: This research demonstrates that context-specific and adaptable educational models are essential for strengthening pediatric surgical capacity in low-resource environments. To successfully integrate these research findings into practice, standardized evaluation frameworks and regionally coordinated training networks are required. Furthermore, lessons from these international initiatives can inform strategies to improve surgical access and health equity in remote or underserved areas in Canada. Establishing sustainable, flexible learning infrastructures is a critical step toward ensuring all children have access to safe surgical care.

# When Endocarditis Hides: Diagnostic Challenges in Destructive *Salmonella enteriditis* Infection With Mitral Annular Calcification

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Introduction: Invasive Salmonella infection is a rare cause of pericarditis with a 2025 review noting only 30 reported cases and a 14.8% mortality rate.[1] Existing literature describes a range of clinical presentations with limited Canadian presentations. We present a case of disseminated Salmonella infection complicated by purulent pericarditis, multifocal embolic infarction involving the central nervous system, and destructive peri-annular cardiac involvement. The extensive multisystem dissemination and cardiac complications in this case highlights the diagnostic and management challenges posted by this rare entity.

Methods: We report a retrospective case of a 72-year-old male presenting with septic shock secondary to *Salmonella enteritidis* bacteremia. Clinical progression, microbiologic data, and multimodal imaging were reviewed extensively.

Results: A 72-year-old male presented to hospital with an altered level of consciousness and found to be in septic shock requiring admission to the intensive care unit, intubation, and vasopressor support. Blood and urine cultures revealed *Salmonella enteritidis*. Despite appropriate antimicrobial therapy, persistent neurological deficits prompted MRI of the brain and spine, which demonstrated multifocal embolic infarcts with associated spinal involvement, raising concern for septic embolization.

Initial transesophageal echocardiography revealed severe mitral annular calcification (MAC), moderate mitral regurgitation, and moderate pericardial effusion, without definitive vegetations. A thromboembolic mechanism related to atrial arrhythmia was initially favored. However, clinical deterioration with worsening hypotension prompted repeat imaging, demonstrating progression to a large pericardial effusion. Pericardiocentesis yielded purulent fluid positive for *Salmonella enteritidis*, despite documented clearance of bacteremia.

Subsequent cardiac CT demonstrated caseous mitral annular calcification with structural breakdown and a contained rupture extending into the left atrioventricular groove and pericardial space, consistent with destructive peri-annular involvement. The patient underwent urgent cardiac surgery including mitral valve replacement, coronary artery bypass grafting, and drainage of purulent effusions. The postoperative course was complicated by multiorgan dysfunction requiring prolonged intensive care support and the patient ultimately succumbed to complications of his illness.

Conclusion: This case highlights the diagnostic challenges of infective endocarditis in the absence of vegetations seen on TEE, particularly in the setting of extensive MAC. Multimodality imaging was essential in identifying destructive peri-annular extension and guiding timely surgical intervention. This case underscores the importance of early integration of advanced imaging modalities to avoid delays in diagnosis and management of complex endovascular infections. Delayed recognition results in progressive structural complications, necessitating complex surgical intervention and suboptimal outcomes.

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Figure/Table:

**Figure 1.** Excised mitral valve specimen demonstrating extensive mitral annular calcification.

# Investigating Gender Differences in Canadian Plastic Surgery Online Patient Education

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**Introduction**: The demand for cosmetic surgery is growing in North America. Despite this, plastic surgery clinics focus little on marketing procedures to the male population. We investigated gender differences among online Canadian plastic surgery advertising.

**Methods:** A systematic search using Google (Mountain View, CA) was conducted to analyze the websites of Canadian plastic surgery centers. The 2021 College of Physicians and Surgeons directory for each province was used to identify all practicing plastic surgeon physicians. A systematic search using Google (Mountain View, CA) was conducted to analyze the websites of Canadian plastic surgery centers, in the following manner: "[physician name] [province of practice]".

**Results:** A total of 209 websites and 13,838 images were identified and analyzed. Of these images, 12,386 (90%) were female and 1452 (10%) were male patients or models. While only 20% had a male services page, 62% of all centres offered gynecomastia procedures. Most common procedures targeting men were blepharoplasty (95%), liposuction (93%), and abdominoplasty (93%).

**Conclusion:** Despite the growing interest for male cosmetic surgery, many plastic surgery centres are not tailoring their marketing to focus on male patients. Plastic surgeons will benefit from increasing their marketing efforts to a male audience.

Figure or Table:

Table 2. Percentage of websites containing male only pages, per each region of Canada.

| Region | Percent of websites with male only page | P value |
|---|---|---|
| Ontario | 28% | p=0.523 |
| Atlantic Canada | 25% | p=0.634 |
| Quebec | 24% | p=0.534 |
| British Columbia | 19% | p=0.540 |
| Prairies | 4% | p=0.01 |

# A Retrospective Observational Study on Pickleball Injuries in a Canadian Cohort

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Introduction: Pickleball is one of the fastest growing sports in Canada, with over 1 million Canadians playing pickleball monthly[1]. Current literature on pickleball-related injuries is US based, where private healthcare may bias the injuries and underrepresent milder injuries. This study addresses this gap by examining pickleball-related injuries at an outpatient multidisciplinary clinic in Calgary, Alberta.

Methods: Electronic medical records were searched for clinical notes containing the keywords “pickle” or “pickleball.” Eligible charts were reviewed, and data was extracted, anonymized, and analyzed using SPSS.

Results: The final cohort included 216 patients, with a median age of 62 years, mean BMI of 25.0; 62% were female and 38% male. The knee was the most injured region (34%), with 77% of these representing degenerative conditions such as osteoarthritis and meniscal tears, most often associated with pivoting movements. Calf injuries accounted for 21% of injuries, predominantly affecting males in their 40s and 50s, and were typically caused by lunging or running. Shoulder injuries were the third most common (17%), most frequently related to swinging at the ball. Overall injury patterns differed from U.S. studies. 70% of patients presented initially to physicians rather than physiotherapists, and 61% sought care ≥ 3 months after injury onset. Treatment recommendations differed between physicians and physiotherapists, though both groups most frequently advised physiotherapy and home exercises.

Conclusion: Pickleball injuries predominantly affect the lower extremities and are frequently chronic or degenerative in nature, often occurring in players with prior injury or surgery. Delayed presentation and preference for physician-based care suggest opportunities for earlier intervention through physiotherapy. Preventative strategies should emphasize off-court conditioning of knees, ankles, and shoulders with eccentric strengthening exercises, and dynamic warm-up routines involving light aerobic exercise.

References:

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Figure or Table:

**Top 10 Most Common Pickleball Injuries**

| Diagnosis | Number of Instances | % of Cases |
|---|---|---|
| Knee Osteoarthritis | 39 | 18.1 |
| Degenerative Meniscal Tear | 32 | 14.9 |
| Rotator Cuff Pathology | 28 | 13.0 |
| Lateral Epicondylosis | 19 | 8.8 |
| Achilles Rupture | 15 | 6.9 |
| Achilles Tendinopathy | 12 | 5.6 |
| Gastrocnemius Muscle Tear | 10 | 4.6 |
| Long Head of Biceps Pathology | 8 | 3.7 |
| Gastrocnemius Strain | 8 | 3.7 |
| Knee Ligament Sprain | 8 | 3.7 |

# Olecranon Fracture Associated with Latitude Total Elbow Arthroplasty - A Consecutive Cohort Study

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The study was reviewed and approved by the Conjoint Health Research Ethics Board REB 20-0703 University of Calgary.

The author(s) declared no conflicts of interest regarding the research, authorship, and/or publication of this article.

The author(s) received no financial support for the research, authorship, and/or publication of this article.

**Introduction**: Total Elbow Arthroplasty (TEA) is an established surgical treatment to manage etiologies of elbow pain and decreased function. Periprosthetic fractures are recognized complications, but there is limited research on olecranon fractures following TEA. This is a retrospective consecutive cohort study reviewing the surgical management and clinical outcomes of five periprosthetic olecranon fracture complications.

**Methods**: This is a single-center, single surgeon study identifying five periprosthetic olecranon fractures among 62 TEAs with a linked LATITUDE EV™ implant, between 2006 and 2024. The anterior-posterior and lateral elbow radiographs, goniometric elbow range of motion (ROM) arc, and a triceps strength and function Medical Research Council (MRC) score collected post-operatively were retrospectively reviewed. One surviving patient completed prospective evaluation using the Mayo Elbow Performance Score [MEPS] and the Disabilities of Arm, Shoulder, and Hand [QuickDASH] Questionnaire.

**Results:** Eligible patients had a mean age of 77 years (range 69 to 84 years, SD ± 6 years) at index surgery. The mean period from TEA to final follow-up was 23 months (range 8 to 50 months, SD ± 17 months). Four patients were female, and one patient was male. The primary indication for TEA was rheumatoid arthritis (3 elbows), degenerative elbow arthropathy (one elbow), and osteoarthritis (one elbow). The cause of olecranon fracture was intraoperative fracture during TEA (two elbows), acute ground level fall (one elbow), and atraumatic swelling and pain (two elbows). Operative treatment was elected for four of five patients, all receiving linked LATITUDE EV™ implants. The MRC score was 5/5 for all patients except the 4/5 score for the non-operatively managed case. The mean ROM arc did not significantly decrease following the complication (88 degrees compared to 103 degrees). A Wilcoxon signed-rank test demonstrated no significant ($Z \pm 1.96$; $p \leq 0.05$) changes in elbow range of motion from pre-TEA to post-olecranon fracture management. The mean MRC score for triceps strength and function at follow-up was 5/5. The surviving patient scored 65/100 on the MEPS and 48/100 on the QuickDash. Radiographic review demonstrated no implant loosening complications in all patients, and anatomic healing of the two patients managed with open reduction and internal fixation.

**Conclusion:** This case series recognizes olecranon fractures as a distinct complication of linked LATITUDE EV™ TEA, exploring the technical skill of the surgeon, olecranon bone quality, and surgical instrumentation as potential risk factors for fracture, and the outcomes of olecranon fracture management following TEA. In a small cohort, patients with iatrogenic, acute, or atraumatic periprosthetic olecranon fracture complications received both operative and non-operative treatment. There were no significant differences in pre-operative versus post-operative ROM arcs compared to TEAs without fracture. Operatively managed cases resulted in better triceps strength outcomes. These results can serve as a guide for detailed surgical management of periprosthetic olecranon fractures. In clinical practice, surgeons may consider thoroughly examining preoperative imaging and informing patients of increased periprosthetic olecranon fracture risk post TEA when bone olecranon bone quality is poor. The consideration risks we explored may also warrant using increased caution with dull surgical instrumentation on weak bones.

# Comparative Evaluation of Off-The-Shelf CT Autosegmentation Models for Feasibility in Hepatopancreaticobiliary Surgical Planning

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**Introduction**: Three-dimensional reconstructions derived from computed tomography (CT) imaging may support surgical planning in hepatopancreaticobiliary (HPB) surgery by improving visualization of spatial relationships between organs and major vascular structures. This is especially crucial for complex surgeries where evaluation of vessels guides operative strategy. However, the routine clinical use of patient-specific 3D models remain limited as they require manual segmentation of CT scans, a process that may require 20-30 hours per case. Artificial intelligence (AI)-based autosegmentation models offer a potential solution, but are mainly used for radiotherapy planning, thus their performance for HPB-relevant anatomy remains uncertain.

**Methods:** Two contrast-enhanced CT scans from patients with pancreatic head tumours were selected from an institutional database and two non-pathologic contrast-enhanced CT scans were selected from the VinDr Multiphase CT open source data set. HPB-relevant anatomical structures, including solid organs, hollow viscera, ducts, and vessels, were manually segmented in 3D Slicer. Manual segmentations were reviewed by an HPB surgeon to serve as the reference standard. Automated segmentations were generated using two publicly available models: TotalSegmentator and MONAIAuto3DSeg. Model outputs were compared with manual segmentations using Dice Similarity Coefficient (DSC) for volumetric overlap and the 95th percentile Hausdorff distance (HD95) for surface agreement.

**Results:** For the CT scans from patients with pancreatic head tumors, TotalSegmentator demonstrated the highest agreement for larger solid organs including the spleen (DSC 0.87, HD95 5.26 mm), liver (DSC 0.80, HD95 18.16 mm), and stomach (DSC 0.80, HD95 13.30 mm). Performance decreased for smaller structures such as the pancreas (DSC 0.71, HD95 6.06 mm) and duodenum (DSC 0.69, HD95 13.95 mm). Segmentation accuracy was lowest for vascular structures relevant to HPB surgery, including the portal and splenic veins (DSC 0.64), inferior vena cava (DSC 0.71), and aorta (DSC 0.73). DSC and HD95 will be generated for the non-pathologic CT scans.

**Conclusion**: Current publicly available CT autosegmentation models perform well for large abdominal organs but remain unreliable for vascular structures critical to HPB surgical planning.

Development of clinically useful automated tools will likely require training datasets specifically annotated for small-caliber vascular and ductal anatomy.

(355/500 words)

# Investigating Innate Immune System Activation in Non-Resorbing IVD Herniations

## Exploring Macrophage Infiltration and ECM Remodelling in Sciatica-Associated IVD

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**Background:** Lumbar disc herniations (LDH) account for approximately 95% of all disc herniations and are a common contributor of low back pain, which in itself has a lifetime incidence of 80% (1). Severe LDH often results in sciatica, a condition characterized by pain or paresthesia radiating from lumbosacral nerve roots which form the sciatic nerve. Notably, up to 76.6% of LDHs undergo spontaneous resorption, frequently accompanied by symptom relief (2).

Inflammation and the infiltration of monocyte-derived macrophages have been established as drivers of the extracellular matrix (ECM) remodelling thought to be implicated in LDH resorption. Circulating monocyte-derived macrophages can take on various phenotypes which can be broadly classified as pro-inflammatory (M1) or anti-inflammatory (M2) where one is implicated in the initiation and other resolution of inflammation, respectively. In particular, pro-inflammatory cytokines produced by M1 macrophages, such as TNF-α and IL-1β, have been shown to stimulate the expression of matrix metalloproteinases (MMPs), a set of proteolytic enzymes that degrade structural components of the ECM, including those within the intervertebral disc (IVD) (3). Several MMPs, including MMP-3, MMP-7, MMP-9, and MMP-13, have been implicated in IVD ECM homeostasis and degeneration. Notably, pro-inflammatory M1 macrophages have been shown to exhibit an increased expression of MMP-9 in response to elevated inflammatory signalling, while IL-10 stimulated M2c macrophages, a subtype of M2, have been described to promote greater ECM remodelling through the expression of MMP-7 (4,5). However, the mechanisms underlying distinct macrophage polarization states and how they contribute to differential MMP expression during the process of spontaneous LDH resorption remains unclear.

This study aims to integrate preliminary histological findings with a broader analytical approach to investigate macrophage-driven ECM remodelling in herniated IVD tissue.

**Methods:** IVD tissue associated with LDH were collected from sciatica patients while control IVD tissue was collected from healthy organ donors. Both underwent 4% formalin-fixed paraffin-embedding treatment prior to testing. The embedded samples were sliced at 8 µm using a microtome and used for histological and immunohistochemical staining. Staining protocols were tailored based on the marker being tested (CD68, CHP, CD206), with specific adjustments to antigen retrieval methods and antibody incubation time. After imaging, semi-quantitative metrics, such as (+) stained cell counts and mean fluorescence intensity were analyzed. A total of 4 sciatica samples and 4 normal samples were included.

**Preliminary Results:** Initial analysis demonstrated an increased CD68+ macrophage infiltration in LDH associated IVD tissues relative to the control. Histological staining for collagen hybridizing peptide (CHP) indicated elevated ECM degradation in the LDH associated IVD tissue.

**Conclusion:** These findings provide preliminary evidence linking immune cell infiltration to ECM degradation in sciatica-associated IVD tissue. Importantly, this work establishes a framework for future studies aimed at defining how macrophage polarization states regulate MMP expression and contribute to spontaneous LDH resorption, Further investigation will focus on the characterization of macrophage phenotypic states and protease profiling to establish mechanistic links between inflammation and LDH resorption.

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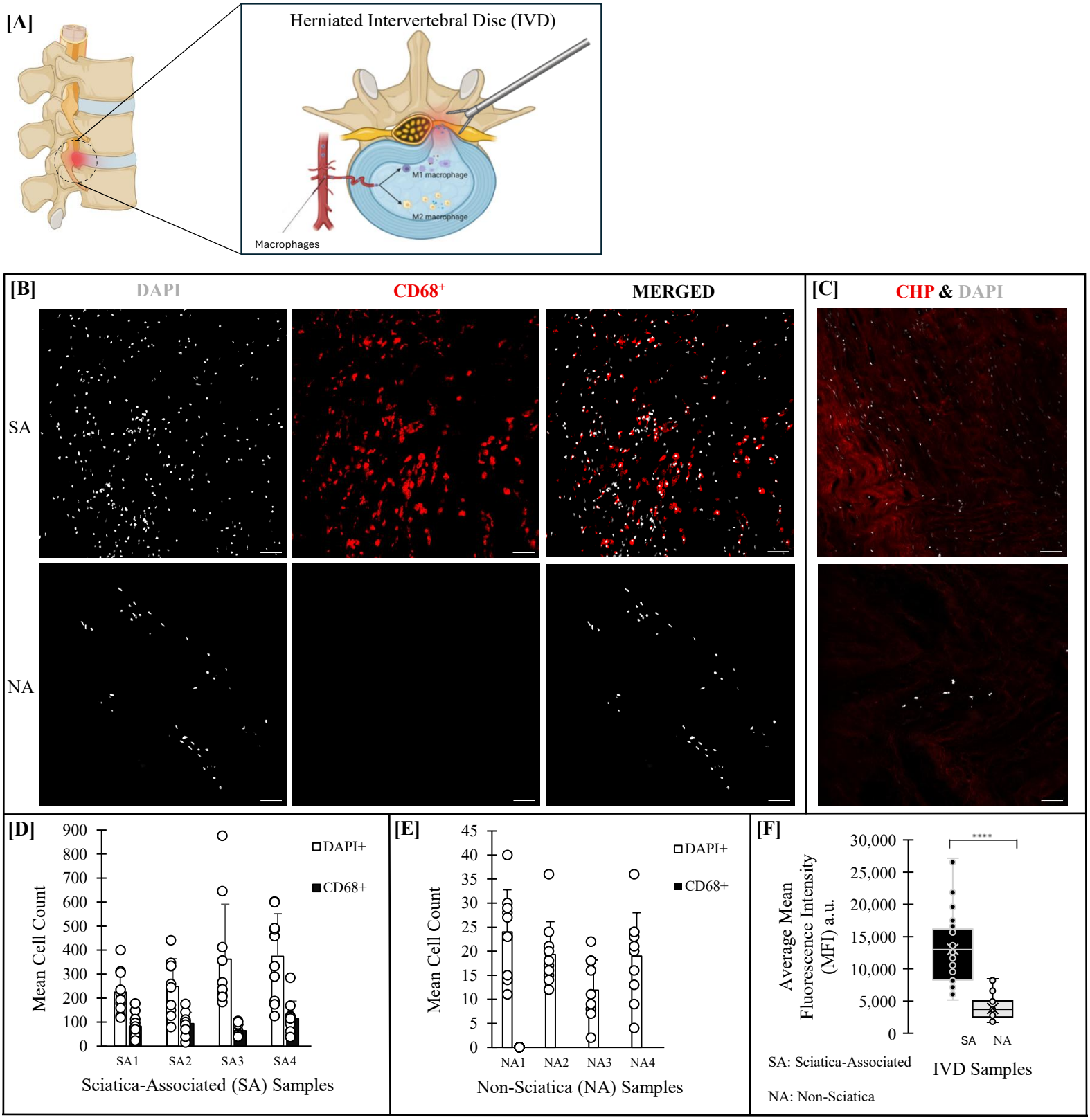
**Figure. CD68$^{+}$ Macrophages and Collagen Breakdown/Remodeling in Sciatica-Associated (SA) and Non-Sciatica (NA) Intervertebral Disc (IVD) Samples.**




**[A]** Schematic of macrophage infiltration into a herniated intervertebral disc (IVD) subsequently undergoing discectomy. **[B]** Representative immunofluorescence images of SA and NA sample regions of interest (ROIs) stained for DAPI (white) and CD68 (red), with merged overlays showing macrophage infiltration. Scale bar = 100 µm. **[C]** Collagen hybridizing peptide (CHP, red) and DAPI (white) staining in SA and NA samples. CHP binds to denatured collagen triple helices highlighting areas of possible collagen remodeling and turnover. Scale bar = 100 µm. **[D]** Quantification of DAPI$^{+}$ nuclei and CD68$^{+}$ macrophages across multiple ROIs in SA samples (n=4). Data shown as mean $\pm$ SD. **[E]** Quantification of DAPI$^{+}$ nuclei and CD68$^{+}$ macrophages across multiple ROIs in NA samples (n=4). Data shown as mean $\pm$ SD. **[F]** Average mean fluorescence intensity (MFI) of CHP signal in SA and NA samples. Data shown as mean $\pm$ SD and **** represents $p \leq 0.0001$.

# Surgery Interest Group (SIG) surgical primer series: Advancing pre-clerkship surgical education through a structured, student–resident collaborative model

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[1]Cumming School of Medicine, University of Calgary, Surgery Interest Group Executive Team

**Introduction:** Pre-clerkship medical education provides essential foundational knowledge; however, opportunities for early clinical and surgical contextualization, mentorship, and collaborative student-resident learning may be variable. Evolving perspectives in surgical education emphasize structured, team-based, and inclusive approaches that support both learner development and well-being[1]. This project describes the design and implementation of a student-led, resident-supported "Surgical Primer" series by the Surgical Interest Group (SIG) at the University of Calgary, intended to complement the progressive RIME curriculum by integrating clinical application, near-peer teaching, and community-building.

**Methods:** Between January and November 2025, 12 primers were delivered across multiple surgical specialties including: cardiac surgery, otolaryngology (ENT), general surgery, obstetrics and gynecology, orthopedic surgery, trauma  plastic surgery, surgical oncology, and urology. Each primer session followed a standardized, reproducible framework. Student–resident pairs selected 3–5 common clinical presentations within the surgical subspecialty that aligned with concurrent RIME content. Medical students were responsible for developing the slide deck and delivering foundational material including essential anatomy, epidemiology, pathophysiology, clinical presentation, diagnostic approach, and indications for non-operative or surgical treatment. Residents then contributed details of operative management with visual media, procedural context, expected outcomes, and reviewed the overall content for clinical accuracy. Sessions were held on weekday evenings to minimize interference with curricular and clinical responsibilities. Attendance was free and available to anyone from the Class of 2026, 2027, 2028. An emphasis was placed on primers having educational value for any medical student, regardless of career interest in surgical specialties. Organizational logistics such as funding, room bookings, and promotion were coordinated by SIG executives, with minimal faculty involvement. Each primer was allocated $150-$200 of CMSA funding unless supported by an industry or surgical department sponsor. Resident recruitment was a collaborative effort between executives and student presenters. Primers were scheduled in the academic calendar based on relevance and proximity to units within the RIME curriculum as well as student interest and resident availability. Standardized templates and how-to documents created by SIG executives supported reproducibility.

**Results:** A total of 14 surgical residents and 17 pre-clerkship students participated as presenters. 24 hours of introductory surgical education were delivered consistently across specialties using a uniform structure, demonstrating feasibility and scalability within a single academic year. Attendance ranged from 30–65 learners per session, suggesting sustained engagement across cohorts. The primer series enabled distributed leadership opportunities amongst classmates, facilitated early student–resident mentorship, and created a collaborative learning environment characterized by shared teaching roles and reduced hierarchy. The initiative has been continued by subsequent student leadership, supporting reproducibility.

**Conclusion:** SIG Primers demonstrated that a structured, student–resident collaborative model can feasibly supplement pre-clerkship education with surgical emphasis while maintaining alignment with existing curricula and minimizing additional resource burden. Beyond reinforcing clinical concepts, the initiative supports early mentorship, shared learning, and a sense of community - elements increasingly recognized as important in surgical education and learner wellness[2]. This model offers a reproducible framework for enhancing both educational experience and engagement of students and residents within undergraduate medical education. Future work should evaluate its impact on clinical preparedness and learner outcomes.

## References

[1]Eberlein TJ. A new paradigm in surgical training. *J Am Coll Surg*. 2014;218(4):511–518.
[2]Bisgaard EK, Moore MK, Stadeli KM, et al. Defining the culture of surgery. *J Am Coll Surg*. 2023;237(2):280–290.

## Figures or Tables

| Surgical Primer Topics | Medical Student Presenters |
|---|---|
| **Cardiac & Thoracic Surgery** | Omar El Ferri (MS2), Barak Almarzouq (MS2) |
| **Ear, Nose, Throat (ENT) Surgery** | Jessica Hammal (MS3), Josh Seto (MS2), Farah Ali (MS2), Yousef Darwish (MS2) |
| **General Surgery** | Angela Galeos (MS2), Fatima Iqbal (MS2) |
| **Obstetrics & Gynecology** | Priyanka Mungara (MS2), Josh Seto (MS2) |
| **Orthopedic & Trauma Surgery** | Olivia Yung (MS2), Leo Ochieng (MS2), Ahmad Hassan (MS2) |
| **Plastic Surgery** | Faye Graff (MS2), Jennifer Dorsey (MS3) |
| **Surgical Oncology** | Skanda Kaushik (MS2), Kaiden Jobin (MS2) |
| **Urology** | Kaiden Jobin (MS2) |

**Figure 1.** Medical student presenters for surgical primers from January 2025 – November 2025