

2023 ORTHOPAEDIC FELLOWS RESEARCH DAY

Congratulations to UTOSM's fellow Dr. Oren Zarnett for winning best e-poster at the University of Toronto's Orthopaedic Fellows Research Day!

Dr. Zarnett's scoping review evaluates what evidence-based modalities exist to teach trainees shoulder, elbow, and wrist arthroscopy. The results indicate that while there are many interventions to teach shoulder arthroscopy, there is a need for more studies focused on teaching elbow and wrist arthroscopy.

Scoping review of evidence based educational tools to teach arthroscopy of the upper limb and development of a novel virtual reality elbow arthroscopy simulator

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Abstract

Background: Arthroscopy has become an integral skill in orthopaedics, with a basic level of competency required of graduating residents. Upper limb arthroscopy involving the shoulder, elbow, and wrist is often challenging to learn, and resident case log data often does not meet the required numbers to become proficient.

Purpose: The purpose of this review is to assess what evidence based educational modalities exist to teach trainees arthroscopy of the shoulder, elbow, and wrist.

Methods: We searched MEDLINE using the search terms "arthroscopy," "education," and "teaching" from September 2018 to December 2022. Only English language articles were included in the review. Articles were included if they described an experiential or educational technique to teach arthroscopy of a joint in the upper extremity including the shoulder, elbow, or wrist. Articles were required to have an outcome measure assessing the effectiveness of the teaching intervention. Article titles were screened for relevance to the literature search. The selected articles were then read in full to assess whether they met the inclusion criteria. From the study, we documented the joint involved, type of study, study population, teaching intervention, and outcome.

Results: Our literature search resulted in 1379 articles of which 18 met our inclusion criteria. Sixteen articles looked at an intervention to teach shoulder arthroscopy, 2 studies looked at wrist arthroscopy, and there was no studies looking at elbow arthroscopy. Educational interventions included cadaver training (n=4), physical simulators (n=5), virtual reality simulators (n=8), proficiency based progressive training curriculum (n=1), review courses (n=3), didactic lectures (n=2), computer based learning (n=1), and use of a wide angle arthroscopy (n=1).

Conclusions: While there are many interventions studied to teach shoulder arthroscopy, we found a need for more studies focused on teaching arthroscopy of the elbow and wrist.

Methods

Search strategy and selection criteria

We searched MEDLINE using the search terms "arthroscopy," "education," and "teaching" from September 2018 to December 2022. The review was done by two authors independently. Only English language articles were included in the review. Articles were included if they described an experiential or educational technique to teach arthroscopy of a joint in the upper extremity including the shoulder, elbow, or wrist. Articles were required to have an outcome measure assessing the effectiveness of the teaching intervention. Article titles were screened for relevance to the literature search. The selected articles were then read in full to assess whether they met the inclusion criteria. From the study, we documented the joint involved, type of study, study population, teaching intervention, and outcome.

Current Direction

Development of a virtual reality elbow arthroscopy simulator

Figure 1. A) Pre-portal placement of an arthroscopy case with the knee set. The simulation guides the user through the steps of the procedure. B) Virtual reality simulation of the elbow joint. The user can view the joint from multiple perspectives and interact with the virtual environment.

Module 1: Arthroscopic portal placement module (complete)
Module 2: Scoping module (in progress)

Results

Introduction

Arthroscopy has become an integral skill in orthopaedics, with a basic level of competency required of graduating residents. The apprenticeship model of training has long been the hallmark of orthopaedic education, with the same training principle applied to arthroscopy in many residency-training programs (Abdo et al. 2022).

While cadaveric specimens have largely been considered the gold standard for practice outside of the operating room, their availability is often limited. Other modalities including arthroscopy simulators and virtual reality training have gained more popularity in recent years.

Upper limb arthroscopy, specifically of the shoulder, elbow, and wrist, is often more challenging to learn. Complex anatomy, and risks from nearby neurovascular structures, necessitates newer strategies to teach these skills to residents in a safer environment outside of the operating room. Further, studies have shown that skill to knee arthroscopy does not necessarily translate to competency in scoping other joints (Loh et al. 2023).

The purpose of this review is to assess what evidence based educational modalities exist to teach trainees arthroscopy of the shoulder, elbow, and wrist, and whether we need to develop more educational tools to teach upper limb arthroscopy.

Discussion

- While there are many studies teaching shoulder arthroscopy, there are very few focusing on the elbow and wrist.
- Particular to elbow arthroscopy, one survey suggested that a surgeon needs approximately 39 cases to be safe, and 93 cases to be proficient (Key et al. 2020).
- Based on our log data, over the years the average number of elbow sports medicine cases a resident will see is 2.5, while the average sports fellow will see approximately 17 cases (Baysas et al. 2021). Of note, in addition to arthroscopy, these cases may include open distal bicip repair.
- This discrepancy between the number of elbow arthroscopy cases need, and seen, necessitates that we augment surgical training with other modalities if we are aiming to train proficient surgeons.

CHECKING IN WITH THE TEAM



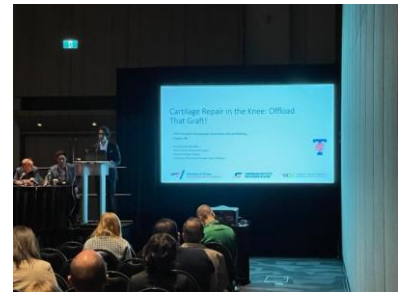
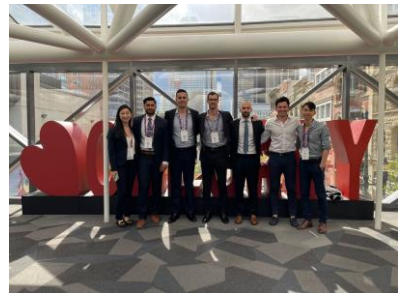
Travelling Fellow Dr. Damjan Dimnjakovic with UTOSM's Dr. Jas Chahal and Dr. Sam Park



Team Physician Rounds – "Hip Injuries & FAI" with special guest Dr. Olufemi Ayeni

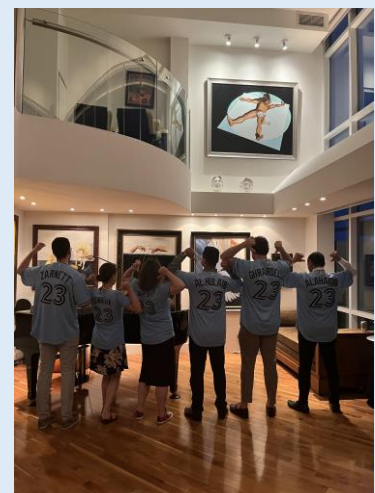


COA 2023 in Calgary, Alberta



2022-23 FELLOWS GRADUATION

A big congratulations and thank you to our 2022-23 Fellows! All the best on your new adventures!



2023 PUBLICATIONS

1. [In-office needle arthroscopy is a cost-effective alternative for operating room diversion in medial meniscectomy: a financial analysis](#) – Abouali J | Journal of Orthopaedic Surgery and Research | June 2023
2. [A Dedicated Orthopaedic Trauma Room Improves Efficiency While Remaining Financially Net Positive](#) – Abouali J | Journal of Orthopaedic Trauma | January 2023
3. [Posterior tibial slope, notch width index and tibial tubercle to trochlear groove distance contribute to development of mucoid degeneration of the anterior cruciate ligament: a systematic review](#) – Abouali J | Knee Surgery, Sports Traumatology, Arthroscopy | April 2023
4. [Circulating MiRNA Signature After Anterior Cruciate Ligament Reconstruction Surgery](#) – Chahal J, Dwyer T, Ogilvie-Harris D | Osteoarthritis and Cartilage | March 2023
5. [Is anterior knee pain following anterior cruciate ligament reconstruction a consideration for graft choice, and the influence of COVID: a qualitative analysis in recreational athletes](#) – Chahal J, Dwyer T, Ogilvie-Harris D, Theodoropoulos J | BMC Sports Science, Medicine and Rehabilitation | March 2023
6. [Use of an Artificial Intelligence Conversational Agent \(Chatbot\) for Hip Arthroscopy Patients Following Surgery](#) – Dwyer T, Whelan D, Chahal J | Arthroscopy, Sports Medicine, and Rehabilitation | March 2023
7. [What's New in Sports Medicine](#) – Chahal J | The Journal of Bone & Joint Surgery | February 2023
8. [Clinical and Radiographic Criteria Define “Acceptable” Surgical Correction of Hip Femoroacetabular Impingement Syndrome as Well as Postoperative Complications: An International Modified Delphi Study](#) – Dwyer T, Whelan D | Arthroscopy | May 2023
9. [Mesenchymal Stem/Stromal Cells: Patient Responses to Mesenchymal Stromal Cell \(MSC\) Therapy in Osteoarthritis are Associated with Differential Clinical Phenotypes, Molecular Endotypes, and MSC Critical Quality Attributes](#) – Chahal J | Cytotherapy | May 2023
10. [Position statement: management of rotator cuff tears in adults](#) – Henry, P | Canadian Journal of Surgery | April 2023
11. [An Analysis of Shoulder Surgeon Volume on Surgeon Competency, Hospital Costs, and Adverse Events: A Systematic Review](#) – Leroux, T | Indian Journal of Orthopaedics | April 2023
12. [Endothelial Progenitor Cell Therapy for Fracture Healing: A Dose-Response Study in a Rat Femoral Defect Model](#) – Nauth A | Journal of Tissue Engineering and Regenerative Medicine | February 2023
13. [Outcomes following arthroscopic posteromedial osteophyte resection and risk of future ulnar collateral ligament reconstruction](#) - Paul R | Journal of Shoulder and Elbow Surgery | January 2023
14. [Biomechanical Comparison of 3 Medial Patellofemoral Complex Reconstruction Techniques Shows Medial Overconstraint but No Significant Difference in Patella Lateralization and Contact Pressure](#) – Tomescu S, Wasserstein D | Arthroscopy | March 2023
15. [Patient-Reported Experiences of Musculoskeletal Virtual Care Delivered by Advanced Practice Physiotherapists](#) – Veillette C | Physiotherapy Canada | March 2023
16. [Disparities in Healthcare Outcome Measures Following Elective Surgery for Osteoarthritis from 2004 to 2018 In Ontario, Canada](#) – Veillette C | Osteoarthritis and Cartilage | March 2023
17. [Cost-Utility Analysis: Understanding The Economic Impact of Surgical Non-Response In Orthopaedic HIP, Knee and Spine Surgery for Osteoarthritis](#) – Veillette C | Osteoarthritis and Cartilage | March 2023

2023 PUBLICATIONS

18. [Patient-Reported Experiences of Musculoskeletal Virtual Care Delivered by Advance Practice Physiotherapists](#) – Veillette C | Physiotherapy Canada | March 2023
19. [Predictors of Increased Frailty Index Scores in Surgical Randomized Controlled Trials: An Umbrella Review](#) – Whelan D | World Journal of Surgery | January 2023
20. [Assessment of 30 Years of Randomized Controlled Trials in *The American Journal of Sports Medicine*: 1990-2020](#) | Whelan D | Orthopaedic Journal of Sports Medicine | May 2023
21. [Presentation and Surgical Management of Multiple Ligament Knee Injuries: A Multicenter Study from the Surgical Timing and Rehabilitation \(STaR\) Trial for MLKIs Network](#) | Whelan D | Journal of Bone and Joint Surgery | April 2023