

Dr. David Pichora

Queen's University -

[Link to Queen's profile at http://surgery.queensu.ca/home/attending_staff/dr_david_pichora](http://surgery.queensu.ca/home/attending_staff/dr_david_pichora)

HDH Departments – Orthopaedics, Plastic Surgery

Research Story

Dr. David Pichora, Professor of Surgery and Mechanical Engineering at Queen's University, orthopaedic surgeon at both Kingston General Hospital (KGH) and Hotel Dieu Hospital (HDH), and CEO of Hotel Dieu Hospital, engages in collaborative research with all three of his affiliated institutions. Recently, he worked with colleagues in the Queen's Departments of Surgery (affiliated with KGH and HDH) and also Mechanical and Materials Engineering, as well as the Queen's School of Computing, on a new surgical technique for distal radius osteotomies. Fractures of the distal radius are one of the most common types, particularly in those aged 18-25 years and over 65 years.¹ The multi-disciplinary and multi-institutional team of researchers developed computer-generated, patient-specific plastic guides for use during surgery. With the use of computed tomography (CT) scans, the correction as well as the location of the plate and drill holes are planned in advance. This data is incorporated into the patient-specific plastic guide, which is created with a rapid prototyping machine, and displays a mirror image of accessible bone structure during surgery. This allows the surgeon to position the guide at the optimal location in the patient's radius for placement of the plate.

Importantly, the patient-specific plastic guides are easily used in the operating room, and significantly reduce the need for fluoroscopy during surgery. Further, the results of the study were comparable to those obtained with opto-electronic tracking, which requires additional equipment in the operating room as well as the use of sensors and markers. It should also be noted that this newly developed technique improves the accuracy of distal radius osteotomies, and can potentially be used in other forearm deformity surgeries.

The technological innovation used in this study was developed at the Human Mobility Research Centre, which includes sites at both KGH and HDH. The patient sample received care at both hospitals. Funding for this multidisciplinary collaboration was received from the Canadian Institutes for Health Research, the Canada Foundation for Innovation, and the Natural Sciences and Engineering Research Council of Canada.

This is a wonderful example of where researchers from different institutions (KGH, HDH and Queen's) and perspectives can collaborate to pursue a greater wisdom and understanding of a surgical issue, enabling people with common interests to make positive change through innovation.

The findings of the research team have been published as:

Kunz M, Ma B, Rudan JF, Ellis RE, Pichora DR. Image-guided distal radius osteotomy using patient-specific instrument guides. J Hand Surg. 2013; 38A: 1618-1624.

Reference

1. Medscape Reference. Distal Fractures of the Radius. Epidemiology. [This link is available at: http://emedicine.medscape.com/article/1245884-overview#a0199](http://emedicine.medscape.com/article/1245884-overview#a0199) (Accessed September 4, 2013).