

Who are we? What do we do?

TEAM

- Biomedical engineers
- Orthopaedic surgeons
- Imaging scientists

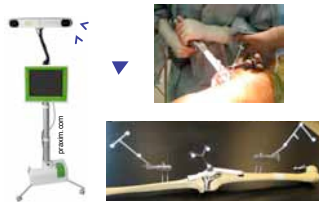


GOAL

Improve the outcome of joint replacement surgery.

AREAS OF RESEARCH

- 1) Computer-assisted surgery (CAS) techniques to help surgeons improve surgical planning and accuracy
- 2) Computed tomography (CT) and fluoroscopic imaging to compare movement & contact within patients' joints
- 3) CAS simulations to enhance surgical training



CAS combines tool & bone information to guide the surgeon to achieve the surgery as planned.



CT models allow us to look inside the joint to determine abnormal movement and contact.

Why is this research important?

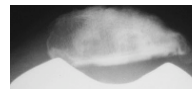
JOINT REPLACEMENT SURGERY

- 800,000+ joint replacements / year in the US¹
- 70,000+ joint replacements / year in Canada²
- Numbers have doubled in the last decade²



IMPROVEMENTS STILL NEEDED

- 17% of patients are unsatisfied or uncertain about their knee replacement, 2-17 years after surgery³
- 12-26% of patients experience pain around their kneecap after knee replacement⁴
- Each joint has unique failures



Impingement of the kneecap on the femoral component due to an incorrect bone cut [Baldini 2006]



Loosening of the glenoid component in the shoulder



Fracture of the femoral neck after hip resurfacing [Hess 2004]

1. DeFrances CJ (2008) National Hospital Discharge Survey 2. Canadian Joint Replacement Registry (2007) 3. Robertsson O (2000) Patient Satisfaction After TKA Based on 27372 Knees 4. Hémy N (2008) To Resurface or Not to Resurface the Patella.

Where will this research lead?

COMPUTER-ASSISTED SURGERY: CAS provides the opportunity to improve accuracy, identify and correct problems during surgery, and analyze data across surgeries, potentially leading to reduced pain & greater satisfaction.

MEDICAL IMAGING: Looking inside the joint allows us to compare good results to poor, potentially improving implant design, patient selection, preoperative issues, intraoperative accuracy or postoperative rehabilitation.

SURGICAL TRAINING: CAS simulations may increase decision-making skills + technical skills of residents.

