Sydney Orthopaedic Trauma & Reconstructive Surgery Research

SOTRS Research was established in 2007 and has been actively running clinical research from Dr Molnar’s practice in Kogarah. Studies active in 2013-2014 include:

The Journey TKA Project: A Comparison of Two Concepts for Improved Function of Knee Replacements

Total Knee Arthroplasty (TKA) is considered a very successful treatment for painful osteoarthrosis of the knee. The results show an implant survival in-situ of approximately 95 percent after 10 years of implantation, and 84 percent after 15 years. However, despite the good results in terms of pain relief and longevity there are still some aspects that need further consideration. These factors include patient satisfaction, knee function and wear over time. The purpose of this prospective randomised trial is to evaluate the performance of the new Journey TKA, and compare it to a well-known and well-functioning standard, the Genesis II.

Radiostereometric Analysis (RSA) of the Genesis II Minimally Invasive Surgery (MIS) Tibial Base Plate

Evaluation of new or improved implant designs using conventional techniques is normally a tedious process taking many years and requiring large patient populations before conclusive results can be drawn. Radiostereometric analysis is a research tool with very high precision which allows detection of impending implant failure and increased wear within 1 to 2 years, and is much quicker in detection than conventional methods. The objective of this study is to measure the migration pattern of the tibial trays using RSA in 15 patients and to compare this data alongside clinical questionnaire data (Oxford Knee Score and EQ5D score) regarding the Genesis II MIS tibial base plate to a previous study involving standard Genesis II tibial base plates.
Prospective Randomised Pilot Study Comparing Plate Fixation with Headless Compression Screw Fixation for the Treatment of Displaced Midshaft Clavicle Fracture

The current treatments of choice for midshaft clavicular fracture are non-surgical management or surgical intervention through plate fixation. Secondary to this, fixation through the intramedullary pinning and/or wiring is also considered a viable option. The headless compression screw is a fixation device that possesses many potential benefits, but its use in midshaft clavicle fixation has not been widely discussed in literature. This randomised study aims to assess and compare the functional outcomes in patients who have suffered a midshaft clavicle fracture, and have been surgically treated through either plate fixation or through an intramedullary headless compression screw.

Patellofemoral Contact Pressure Following Iliotibial Band Release

The optimal treatment modality for patients suffering from patellofemoral osteoarthritis remains controversial. The iliotibial band (ITB) exerts a strong posterolateral force upon the patella that can cause pain over the lateral femoral condyle and compress the joint space. In this study, we are further investigating the ITB release procedure as a method of potentially unloading the joint and realigning lateral patellar maltracking issues. This is being achieved through the use of intraoperative pressure sensors placed within the patellofemoral joint that allow for the direct comparison of the forces present in the joint immediately before and after the ITB is released.

Releasing the Iliotibial Band: A 13-year Postoperative Review of 30 Knees

The common modalities of treatment for patellofemoral pain syndrome are non-surgical management through taping, and surgical intervention through lateral retinacular release. Neither of these options has been shown to be a viable long-term solution, thus it has become vital to explore the long-term functional results of the iliotibial band (ITB) release. The objective of this study is to evaluate the
long-term success of iliotibial band release as a surgical adjunct to the lateral retinacular release, and involves contacting patients who have undergone an ITB release up to 13 years ago and assessing their current pain and function through a series of questionnaires.

**Prospective Randomised Study Comparing the Dynamic Hip Screw and Intramedullary Gamma Nail for the Treatment of Intertrochanteric Hip Fracture**

The current treatments of choice for patients suffering from an intertrochanteric hip fracture are the dynamic hip screw and the intramedullary gamma nail. Both devices have been shown to have their advantages and disadvantages, with many conflicting conclusions being drawn from existing studies. The uncertainty of which device is superior often leaves the choice of fixation device up to the preference of the primary surgeon. The purpose of this prospective randomised study is to compare the long-term functional outcome of the Intramedullary Gamma Nail to the Dynamic Hip Screw, by looking at intraoperative factors such operative time, blood loss, operative complications and the cost of each device. During the post-operative period, we will examine the time taken for initial mobilisation, as well as the degree of fracture collapse, fracture union and each patient’s return to activities of daily living.

**Safe Zones for Femoral Tunnels in Multi-Ligament Knee Reconstruction**

As multiligamentous knee injuries are relatively uncommon, there is no broad consensus on the optimal entry points and trajectories for multi-ligament reconstructions. In order to prevent tunnel intersection whilst maximising bone bridging when multiple ligaments and tendons are being reconstructed, it is important to define the “safe zones” that will allow for the maintenance of natural knee kinematics. The ideal entry point and trajectories for the femoral tunnels in ACL reconstruction are well documented, though these are not as clear when performing a PCL reconstruction as the
trajectories can vary significantly depending on whether the traditional outside-in or inside-out method is employed. A cadaveric knee will be used to test for the optimal entry points and trajectories for femoral tunnels to maintain natural knee kinematics.

**Validation of Acetabular Cup Placement in Total Hip Arthroplasty when using Computer Assisted Surgery**

The orientation of the acetabular cup is critical in Total Hip Arthroplasty (THA) for long-term survival and function of the implant. The acceptable “safe zone” of inclination and anteversion for acetabular cup placement lies within a relatively narrow range. Hence, there is strong interest in developing devices and techniques that will allow surgeons to insert these components much more accurately. Computer Assisted Surgery (CAS) has the potential to significantly improve the precision of acetabular cup placement when compared to freehand placement, but this system is not without its drawbacks. In this study, we are attempting to validate a new CAS-based system that reduces the impact that pelvic tilt and a host of other factors have on the final orientation of the acetabular component.

**Evaluating the Accuracy of a Patient-Specific Instrumentation System for Acetabular Component Orientation**

This proposed prospective cohort study is aiming to evaluate the accuracy of a patient-specific instrumentation system (DISCO) that will determine the optimal orientation for the acetabular cup in Total Hip Arthroplasty (THA). To minimise the risk of postoperative complications such as impingements and dislocation, cups must be placed within a “safe zone” of anteversion and inclination. The data from the standard pre-operative CT scans and x-rays will be entered into the patient-specific instrumentation system to create a three-dimensional functional model of the patient’s pelvis. This
model will account for the movement of the hip during functional activities, as and will calculate the optimal orientation at which the acetabular component should be placed within the safe zone.

**Randomised Comparison of Two Skin Preparation Methods in Foot and Ankle Surgery**

Foot and ankle surgery has an increased incidence of post-operative surgical site infections. The complete eradication of skin flora during preoperative preparation has been shown to be difficult, particularly in the forefoot. The aim of this study was to examine the efficacy and efficiency of an alternative method of surgical site preparation for foot and ankle surgery. Fifty one volunteers were recruited for this study which compared standard gauze painting using 2% chlorhexidine with 70% alcohol to immersion of the foot and ankle in a non-sterile bag filled with 60mL of the same solution and rubbing all skin surfaces (bag immersion method). Each method was applied to different feet of each volunteer in a randomized order. The bag immersion method was found to be an efficient alternative surgical site preparation technique in foot and ankle surgery and is as effective as standard gauze painting method in eliminating skin flora.

**Analysis of Pelvic Position and Movement during a Primary Total Hip Arthroplasty**

A recent study by Grammatopoulus *et al* 2014 investigated the post-setup pelvic position and intra-operative movement during a hip replacement for 67 patients using a sophisticated camera apparatus. Their results concluded that there was significant variability in initial pelvic position and movement during a total hip arthroplasty. The aim of this study is to take advantage of the OrthoSoft CAS navigation software’s ability to monitor pelvic tilt to evaluate the variation in pelvic orientation as the surgeon positions the patient on the operating table and the magnitude angular movement that takes place between set-up and implantation of the acetabular component.
Recent publications:

Tibial Rotation Kinematics Subsequent To Knee Arthroplasty

Comparison of a 3-Hole Locking Plate With Angled Screws to a Standard 4-Hole Hip Plate: A Finite Element Study.

A Pilot Study to Assess a Multimodal Approach to Short Stay Arthroplasty.

The Australian Arthroplasty Thromboprophylaxis Survey.

Hip Fracture Surgery and Clopidogrel: Is It Safe To Operate Without Delay?

Iliotibial Band Release as an Adjunct to the Surgical Management of Patellar Stress Fracture in the Athlete: A Case Report and Review of the Literature.
Sports Medicine, Arthroscopy, Rehabilitation, Therapy and Technology. 2009, 1:15.

Minimally Invasive Imageless Computer-Navigated Knee Surgery: Initial Results.


Open Reduction of Intracapsular Hip Fractures Using a Modified Smith-Petersen Surgical Exposure.