

HELPING OTHERS STAND TALL

Support from the College is crucial to continuing work of young research group



Research supported by the College is now underway at the Sydney Orthopaedic Research Institute (SORI) aimed at providing clinicians with a better understanding of knee function and structural integrity following surgery to repair multiple ligament knee injury (MLKI).

The Director of Research at the Institute, Dr Corey Scholes, was last year awarded the Brendan Dooley and Gordon Trinca Trauma Research Scholarship – one of the few scholarships offered by the College which is open to medical researchers working outside the field of surgery.

Dr Scholes said that while a great deal was known about the results of anterior cruciate ligament (ACL) reconstructive surgery, considerably less was known about whether surgical reconstruction could restore knee function to resemble that of uninjured knees and prevent cartilage degeneration following MLKI.

He said the majority of such injuries were caused by trauma such as motor vehicle accidents, sporting injuries or falls.

“Traumatic injuries to the knee involving multiple ligaments are less frequent than isolated injuries, but are often more serious and in some cases devastating to joint function with associated local vascular and neural disruption,” Dr Scholes said.

“These types of injuries are complicated to repair and involve lengthy and costly rehabilitation and can involve long-term negative consequences for the patient with regards to loss of joint function and decreased quality of life.

“A recent survey revealed that despite the lower frequency of multiple ligament injuries, the mean financial cost per occurrence is highest for the knee when compared to all orthopaedic joint dislocations.

“We also know there is an increased incidence of knee osteoarthritis in these patients compared to the general population; however, there remains little data to help identify patients that

may be at risk of rapid onset and development of degeneration as a result of MLKI,” Dr Scholes said.

“We are therefore working to advance efforts to provide clinicians with an objective method to identify patients at risk of poor outcomes or accelerated knee degradation so that treatment plans can be individualised as required.”

Working with patients recruited from the Institute’s database, Dr Scholes is in the process of conducting a ‘gait’ study using facilities and equipment at the Biomechanics Laboratory, University of Sydney, comparing the knee kinematics of post-operative MLKI patients with matched controls while also using custom-designed software to map cartilage from MRI data.

He said the ‘motion capture’ study now underway, was only the second to be conducted on MLKI patients, according to a review of published English scientific papers, and that the team had discovered functional differences in knee kinematics never before reported.

“Knowledge about the long-term effects of MLKI is quite poor for a number of reasons,” he said.

“This is due to the difficulty in obtaining pre-operative data because of the traumatic nature of the injury and also because most patients who suffer a MLKI are usually young, active and part of a mobile demographic that makes long-term follow up analysis difficult and because there are fewer patients overall to study.

“This means that while surgeons and scientists have long had a suspicion that these patients face an increased risk of developing osteoarthritis we don’t know the percentage increase and we don’t know which patients are most at risk.”

Dr Scholes said the small gait study now underway – which examines knee angles during walking in three dimensions – had already revealed that MLKI patients demonstrated significant deficits in overground locomotion compared to healthy controls.

“It’s good to know that the College thinks we are on the right track and also that this work is of interest to the wider clinical community”

In particular, he said that patients with a combined bicruciate and medial injury stepped shorter and wider and also spent more time in double support, alterations which were associated with reduced confidence and altered joint loading.

“In addition, we also found significant differences in knee motion during gait,” he said.

“We now believe that these inter-limb differences in knee angle during weight acceptance and the resulting abnormal knee kinematics will likely have implications for the long term health of the joint, including the possible development of osteoarthritis.”

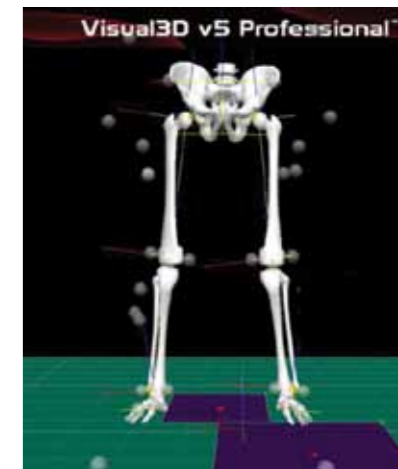
Dr Scholes also said new software had been designed at the Institute to measure the quality of the cartilage across the entire knee joint with researchers now analysing both the patient and control’s cartilage for comparisons.

He said he expected to complete the mapping within the new few months, with his findings to be presented at the next meeting of the Australian Orthopaedic Association meeting in October.

“Our future work will be the continuing exploration of the relationship between cartilage quality, injury patterns and functional tasks,” he said.

The Sydney Orthopaedic Research Institute is a stand-alone not-for-profit organisation established by Dr David Parker and Dr Myles Coolican in 2003 with a mission to empower patients and clinicians with improved methods of diagnosis and treatment to restore knee function.

Dr Scholes has contributed to the multi-disciplinary team at SORI with a background in biomechanics. With surgical and engineering contributions, the team has presented papers on MLKI to the International Society of Arthroscopy and Knee Orthopaedic Surgery as well as to the Australian New Zealand Orthopaedic Research Society, the Australian Orthopaedic Association, the Australian Knee



AWARDS AND SCHOLARSHIPS achieved by Dr Corey Scholes

2013

Friends of the Mater Hospital Foundation: (2 projects)

2013

Brendan Dooley – Gordon Trinca Trauma Scholarship: Royal Australasian College of Surgeons.

2005 - 2008

Queensland University of Technology Vice-Chancellor’s Blueprint Postgraduate Award.

2004

Queensland University of Technology Faculty of Health Honours Research Scholarship.

Society, the Surgical Research Society and the Mater Orthopaedic Research Meeting.

He said that while initial findings were encouraging, the small patient cohort and enormous variability in individual movement, patient confidence and quality of treatment following the initial trauma meant there was still much to be understood.

“There are a number of factors that come into play when you are



SORI Directors: Dr David Parker, Dr Myles Coolican and Dr Brett Fritsch

looking at longer-term functional outcomes following treatment for MLKIs such as the injury itself, the nature of the surgery, the character of the patient and the rehabilitation,” he said.

“Then when you add to these factors the enormous variability in how people move and individual anatomy, the variables can seem infinite.

“There is still some uncertainty even in regard to the long-term results and optimal approaches to ACL surgery and we’re far behind in our understanding of MLKI so the definitive links between outcome, treatment and long-term function will probably only be solved through multi-centre research.

“Still we are working toward giving clinicians a better understanding of the response to treatment through understanding both what is driving abnormal post-operative knee function and movement, and also trying to determine the risk factors specific to MLKI associated with knee degeneration.

“If we understand those, surgeons could be in a better position to adjust or refine surgical techniques or identify patients with a poor prognosis after surgery so they are more swiftly provided with longer term treatment plans such as

physiotherapy or pain management therapy.”

With up to eight researchers working alongside him, depending on funding available, Dr Scholes said he was delighted to have won the support of the College for the work being conducted at the Institute.

“As a relatively young organisation, receiving this scholarship felt like a big pat on the back for us in terms of the research we are conducting and how we are going about it,” he said.

“It’s good to know that the College thinks we are on the right track and also that this work is of interest to the wider clinical community.”

Dr Scholes said he would like to acknowledge funding from the Sydney Orthopaedic Research Institute as well as the input and effort of colleagues and collaborators that have assisted with the project and grant-seeking particularly Amy Brierley, Joe Lynch, Dr Joe Costa, Laurant Kang, Jack Batchen, Milad Ebrahimi, Dr Brett Fritsch, Dr Myles Coolican, Dr David Parker and Prof Qing Li (University of Sydney).

He also thanked Professor Richard Smith and Mr Ray Patton (Biomechanics Laboratory, University of Sydney) for their assistance with access to the laboratory and its equipment.

With Karen Murphy