



## New Zealand ACL Registry Annual Report 2016

### Acknowledgements:

The New Zealand ACL Registry Trust would like to thank the Accident Compensation Corporation for its funding assistance. We also receive funding from our industry partners: DePuy, Device Technologies and Smith & Nephew. We are also grateful for the participation of New Zealand Orthopaedic Surgeons for participating in the Registry, both through financial contributions and enrolling their patients.



## Introduction:

The New Zealand ACL Registry is now in its third year of operation. We are progressing towards our goal of capturing all ACL procedures done in New Zealand. The number of Surgeons and Hospitals involved in the Registry has been steadily growing over the last 12 months. In September 2015 there were 68 participating Surgeons, by September 2016 this number has grown to 117. For the 12 months until September enrolled 2200 patients in the Registry. The numbers through the year continued to grow, and we estimate we are now enrolling around 75% of the estimated 3000 ACL reconstructions performed in New Zealand each year.

## ACL Registry Trust Structure:

The ACL Registry Trust has been registered as a charitable Trust under New Zealand law. The Trustees are Hamish Love, Orthopaedic Surgeon, Christchurch, Mark Clatworthy, Orthopaedic Surgeon, Auckland and David Barker, Accountant, Christchurch.

The Registry has a permanent database Administrator, Charlotte Smith and employs a part-time data entry assistant.

The Registry is currently housed in the Department of Orthopaedic Surgery at Christchurch Public Hospital, alongside the joint Registry. This arrangement has been a good starting point for the registry, but has some limitations. Plans are in place to move to a permanent and more functional facility within the next 12 months.

## Data set integrity:

The Registry continues to work hard on maintaining a complete date set. The majority of individuals requiring ACL reconstruction are young. This group are mobile and often hard to keep a track of. As a consequence, the well-established Registries manage only around 50% follow up at the two-year mark, dropping off to less than 40% at the five-year mark. Currently we are achieving greater than 60% follow up at the two year mark for our primary ACLs and better than that at all preceding time points.

Further measures are being instituted to improve follow up compliance. These include SMS text reminders linking to the outcome questionnaires, giving improving web based access to Registry information and forms.

As the Registry is in its infancy, it will still be several years before we have enough patients out past the 2 year follow up mark required to be able to start analysing data and drawing statistically meaningful conclusions. As we progress towards this point, continued efforts to improve patient enrolment, follow up rates and accuracy and completeness of data set collection are being undertaken.

## Future directions:

### 1. Website and IT development:

The Registry Trust has decided to develop a stand-alone ACL Registry website. This will be a site for information regarding the ACL Registry and for public dissemination of the annual



reports. Additionally, it will provide a link for patients to contact the Registry if required. The website will provide an online portal through which participating Surgeons can easily enter post-operative complications as well as being able to download enrolment forms as needed.

2. International collaboration:

The New Zealand ACL Registry Clinical Advisors remain in regular contact with other Registries around the world. They are working towards international collaboration on major research projects and developing structural arrangements to ensure compatibility between the data sets we collect.



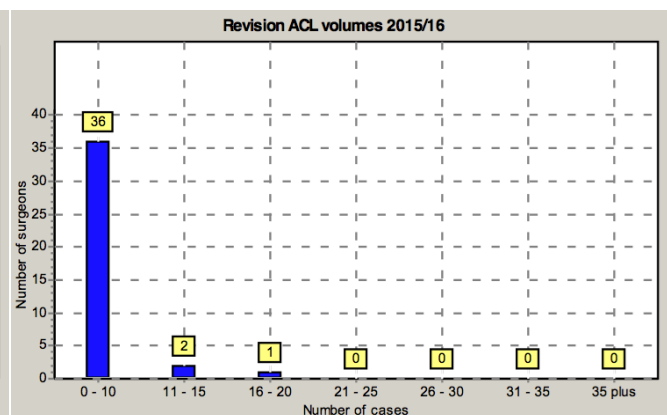
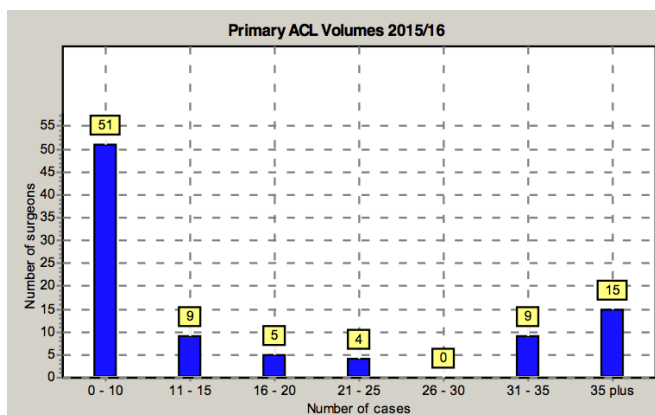
*Results:*

As of 1<sup>st</sup> September 2016, 3239 patients have been enrolled in the ACL registry.  
2933 primary and 306 revision ACL reconstructions were recorded.

*Case volume by hospital:*

Hospital	Number	Percent
SX Christchurch	257	7.8
St Georges	201	6.2
Royston	54	1.6
Manuka Street	106	3.7
Wakefield	138	4.2
Mercy Dunedin	101	3.1
Selina Sutherland	8	0.43
Bowen Hospital	99	3.1
SX New Plymouth	60	1.8
SX Wellington	176	5.4
SX North Harbour	113	3.4
Southland Invercargill	5	0.15
SX, Invercargill	90	2.8
SX, Hamilton	131	4
Belverdale	38	1.2
Mercy/Ascot	657	20.1
SX, Rotorua	48	1.47
SX, Brightside	33	1
Crest	2	0.06
Grace	72	2.2
Forte	229	7.03
Auckland Surgical Centre	450	13.8
Anglesea	2	0.06
Churchill	38	1.1
Chelsea	13	0.4
Bidwell	36	1.1
Braemar	82	2.5
Kensington	10	0.3

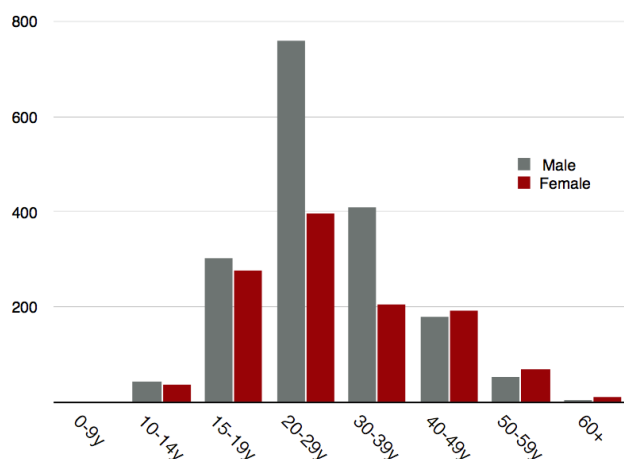
*Case volume by surgeon:*



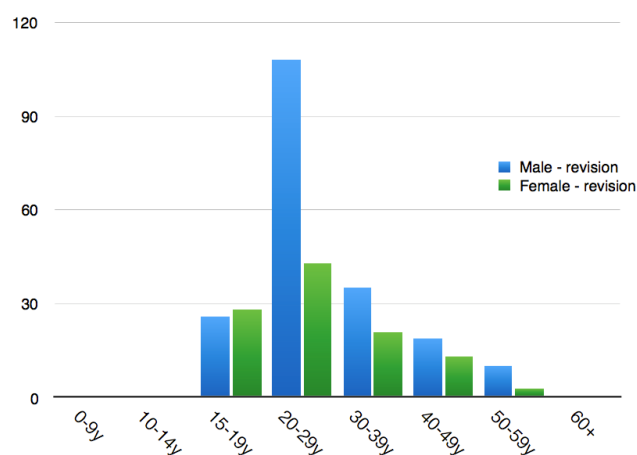


*Demographics:*

	Primary ACL Reconstruction	Revision ACL reconstruction
Male: female	1751:1182 (59.7% male)	198:108 (64.7% male)
Average age at surgery	29.0y (8-68y)	28.4y (15-27y)
Delay to surgery	10.0 months	19.6 months



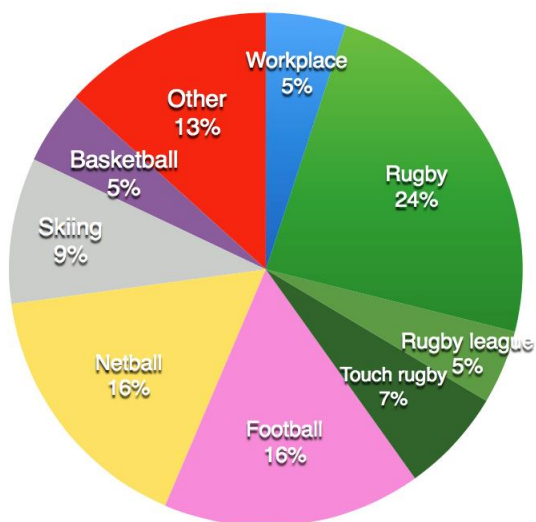
Age distribution: Primary



Age distribution: Revision

*Mechanism of Injury:*

Rugby, in its various forms, was the mechanism of injury in 36% of patients, with football (16%), netball (16%) and snow sports (9%) being the other most common causes.

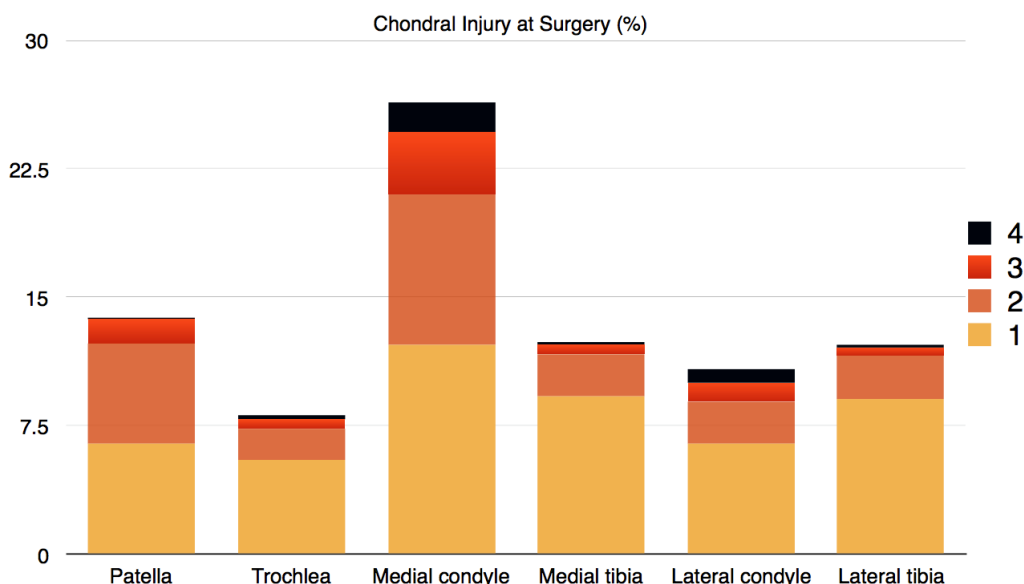




### *Chondral injury:*

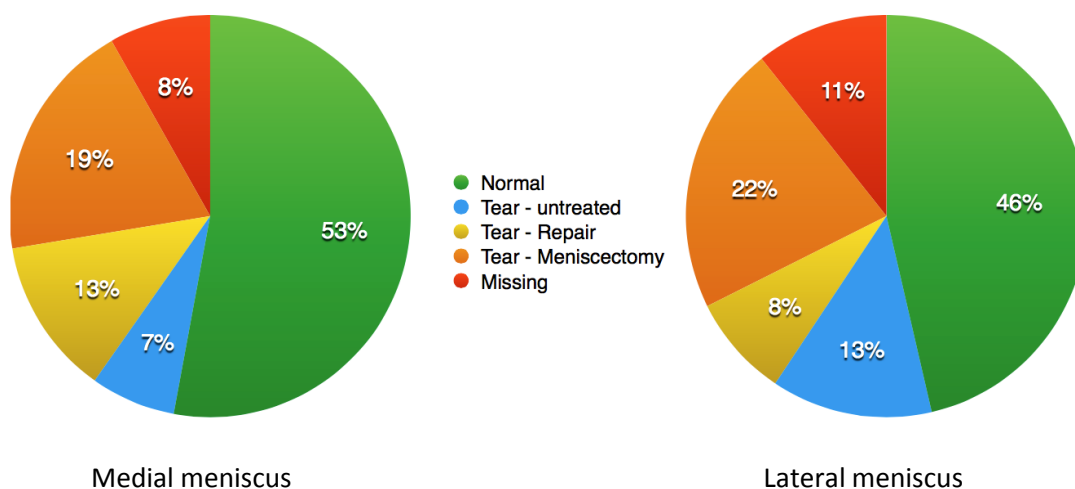
Chondral injuries were common at the time of surgery, the most frequently and severely affected area was the medial femoral condyle, being damaged in 25% of cases, it was also the area most frequently associated with higher grade chondral injuries (ICRS grade 3 and 4).

The majority of the injuries were not treated (72.8%). Chondroplasty was completed in 5.9% and microfracture in 2.6%. The chondral treatment field was not completed in 18% of operative data forms.



### *Meniscal injury:*

About 1/3 of menisci have significant tears requiring treatment at the time of ACL reconstruction (32% medial, 30% lateral). The meniscus are more frequently found to be reparable on the medial side than lateral (40% vs 27%). Implants are used twice as frequently as the more traditional sutures techniques on both sides of the knee.

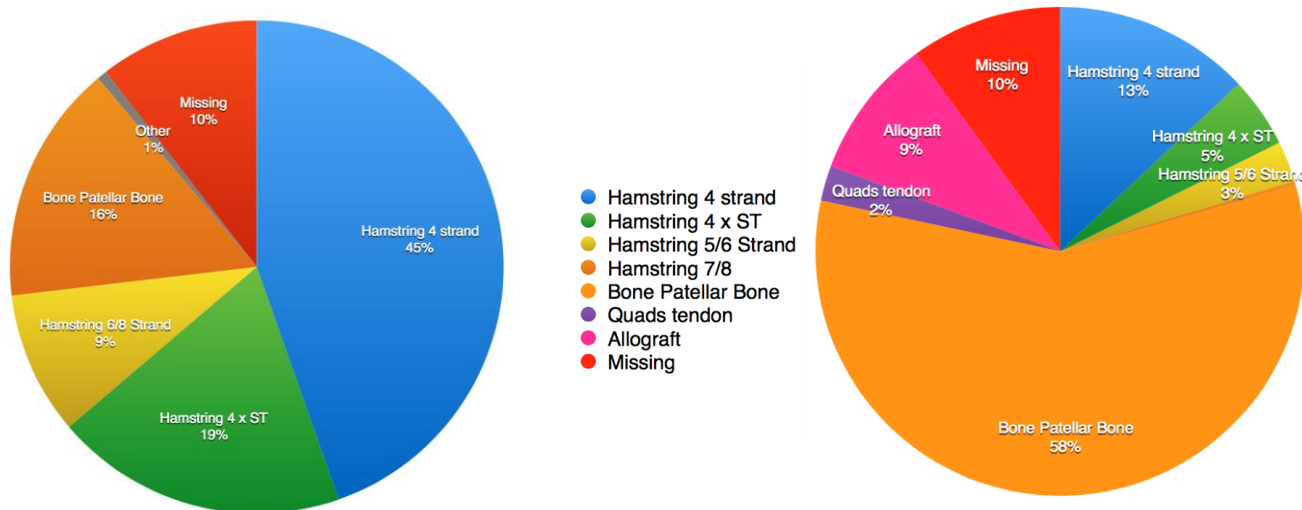




### Graft Choice

For primary ACL reconstruction, the predominant graft choice is hamstring, accounting for 70% of all primary ACLs. 45% are 4 strand grafts with semitendinosus and gracilis. The majority of the others are quadrupled semitendinosus grafts (19%), although there is a trend for an increasing use of 6 to 8 strand grafts (9%). BTB is the next most popular graft, making up 16% of primary ACLs.

These numbers reflect a significant change in graft choice, compared with the 2015 registry figures. The use of quadrupled semitendinosus tendon grafts has increased by 41% (17% up to 24%) and the 6-8 strand hamstring graft use has tripled (4% to 12%). There has been a decrease in the use of BTB grafts by 26% (19% down to 14%) and traditional 4-strand semitendinosus/gracilis grafts by 29% (53% down to 38%).

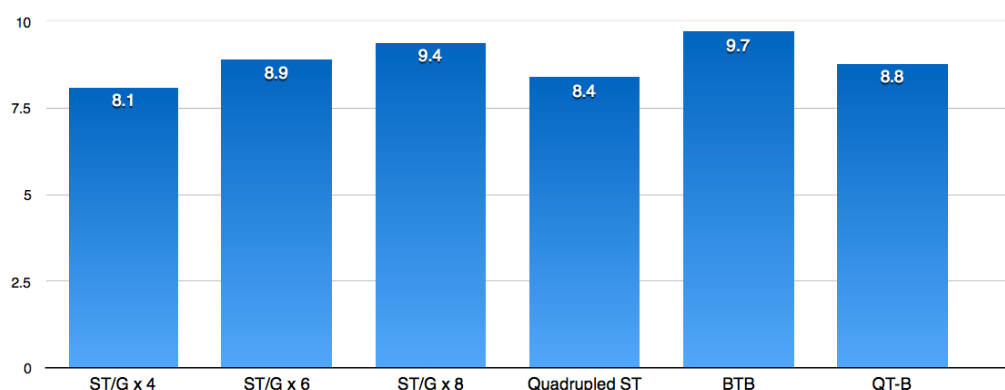


Graft choice: Primary

Graft choice: Revision

### Graft diameter by graft choice:

At this point, there is a trend for larger grafts with the quadrupled semitendinosus and multi-strand semitendinosus/gracilis grafts, compared with 4 strand ST/G grafts. There is no significant difference between the first 2 and the diameters achieved with patellar or quadriceps tendon grafts.



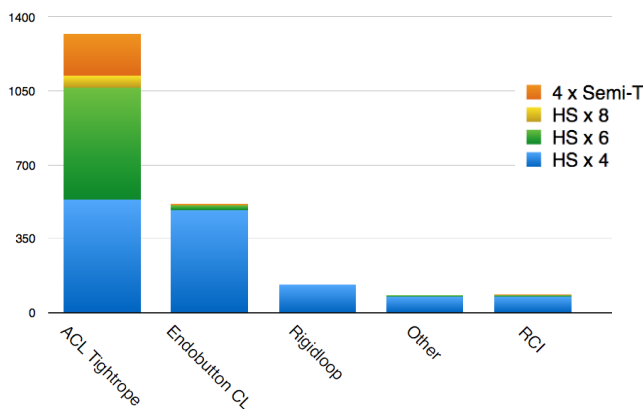


*Tunnel drilling technique:*

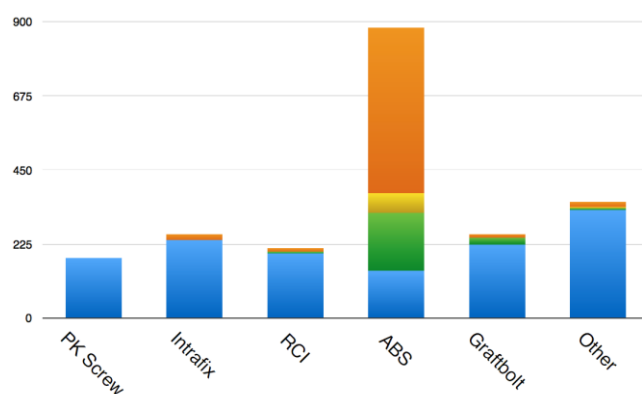
Tibial tunnel drilling data indicates that all are completed with antegrade drilling techniques. However, the operative data form was not completed in 13% of cases. 2 physal sparing cases were recorded.

Femoral tunnel drilling was via an anteromedial portal in 72% of cases, transtibial in 13.5% and outside-in with a Flipcutter technique in 2.3% of cases. Data was missing in 12% of cases.

*Graft fixation technique: Hamstring*

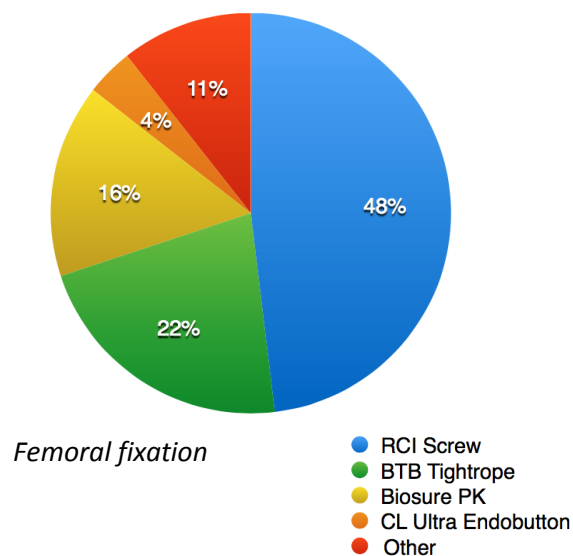


*Femoral fixation*

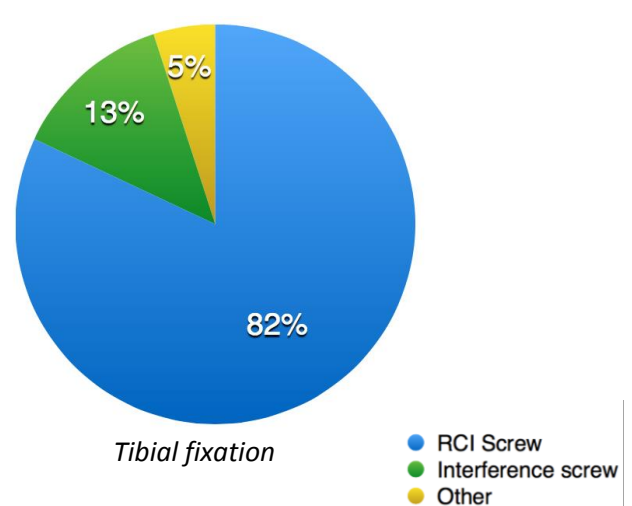


*Tibial fixation*

*Graft fixation: Patellar tendon*



*Femoral fixation*



*Tibial fixation*





*Antibiotic use:*

Cephazolin	76%
Cefuroxime	1.1%
Augmentin	2.4%
None recorded	20%

*Thromboprophylaxis:*

None	82%
Aspirin	8%
Combination	4.4%
TEDs	2.4%
Footpumps/SCDs	2%
Clexane	1.5%

*Complications:*

These are broken down into intra-operative complications, post-operative complications and re-ruptures. Complications are captured in 3 ways. Firstly, treating surgeons enter operative complication on the operative data form. Secondly, post-op complications are recorded on the complications form and returned to the registry. Finally, patients completing follow up questionnaires are asked if they have had any complications relating to their ACL surgery or further injuries to their knee.

	Primary ACL (n)	Revision ACL (n)
<i>Intraoperative complication</i>		
Implant failure	27	1
Harvest failure / tendon damage	30	-
Equipment problem or failure	11	4
Fixation / tunnel complications	-	4
<i>Post-operative complication*</i>		
Infection	2	-
DVT	7	-
Arthrofibrosis	8	1
Implant-irritation/removal	6	2
Other hospital admission	5	4
Meniscal tear	6	2
Donor site problem – hamstring**	20	0
Donor site problem – patella**	7	0
<i>Recurrent instability</i>		
Atraumatic	3	3
Traumatic	37	0
Other / not recorded	21	11
<i>Revision ACL reconstruction</i>	55	9

\* Complications are recorded if they are significant to require hospital readmission or reoperation.

\*\*The exception to this is donor site problems. These are listed if the patient reports significant symptoms related to the graft harvest site.

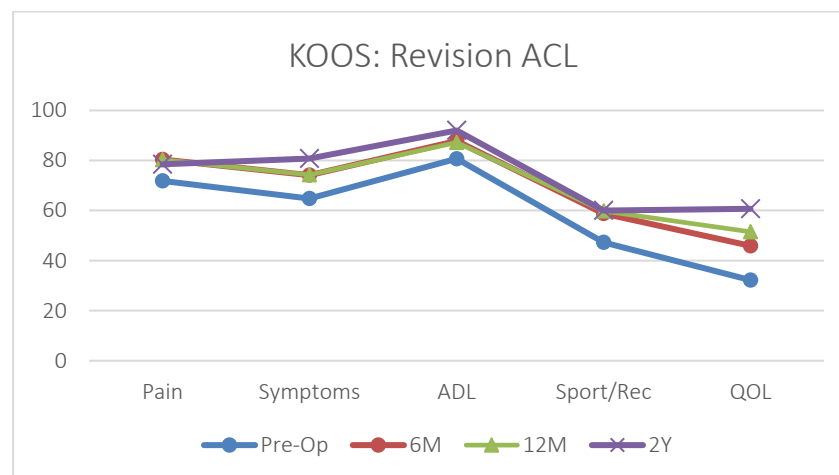
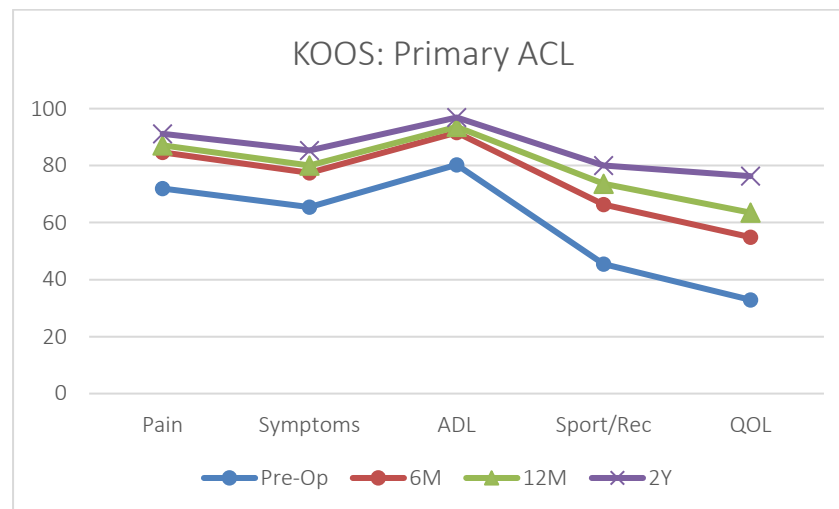
It is worth noting that a significant number of patients reported sensory disturbance over the infrapatellar branches of the saphenous nerve, as an unexpected complication of surgery. Given the commonness of this outcome, it is worth emphasising it's likelihood as part of the informed consent process.



### Outcome scores:

The KOOS score is a validated outcome questionnaire for ACL injuries and surgery. A 5 point scale from 0: none, to 4: Extreme, is completed for each of the subscales. These include:

- Pain: amount of pain in the last week
- Symptoms: Knee injury symptoms in the last week e.g. swelling, grinding, ability to straighten knee.
- ADL: Functional problems with activities of daily living, e.g. descending stairs
- Sport/Recreation: The degree of difficulty in physical tasks performed in the last week e.g. squatting pivoting etc.
- Quality of Life: Awareness of knee problems and confidence in the knee.

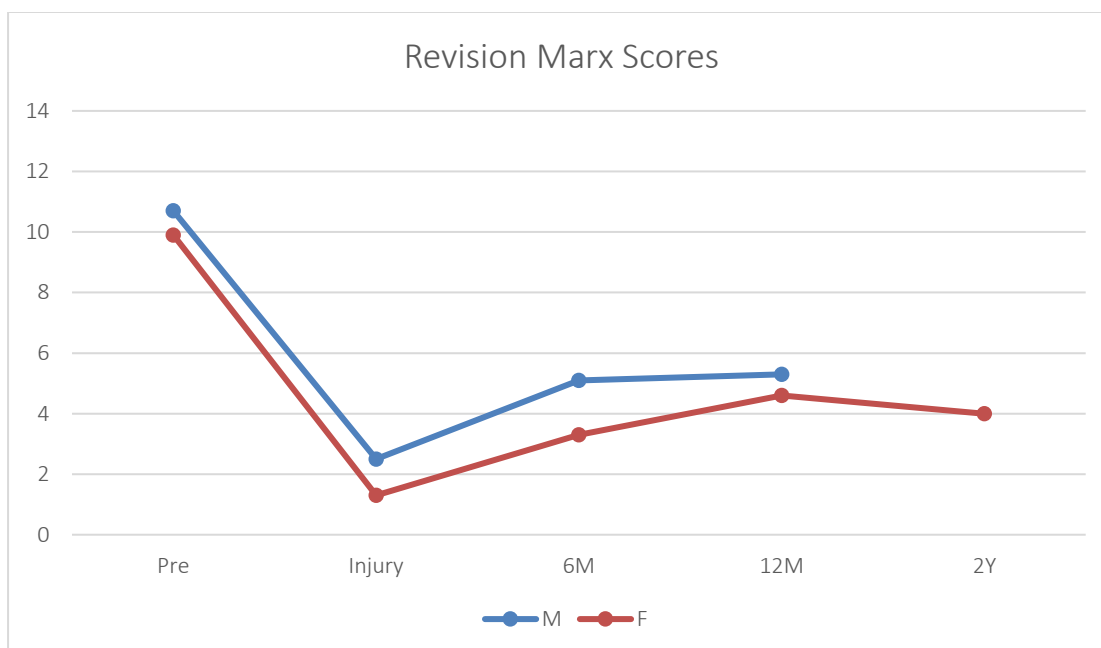
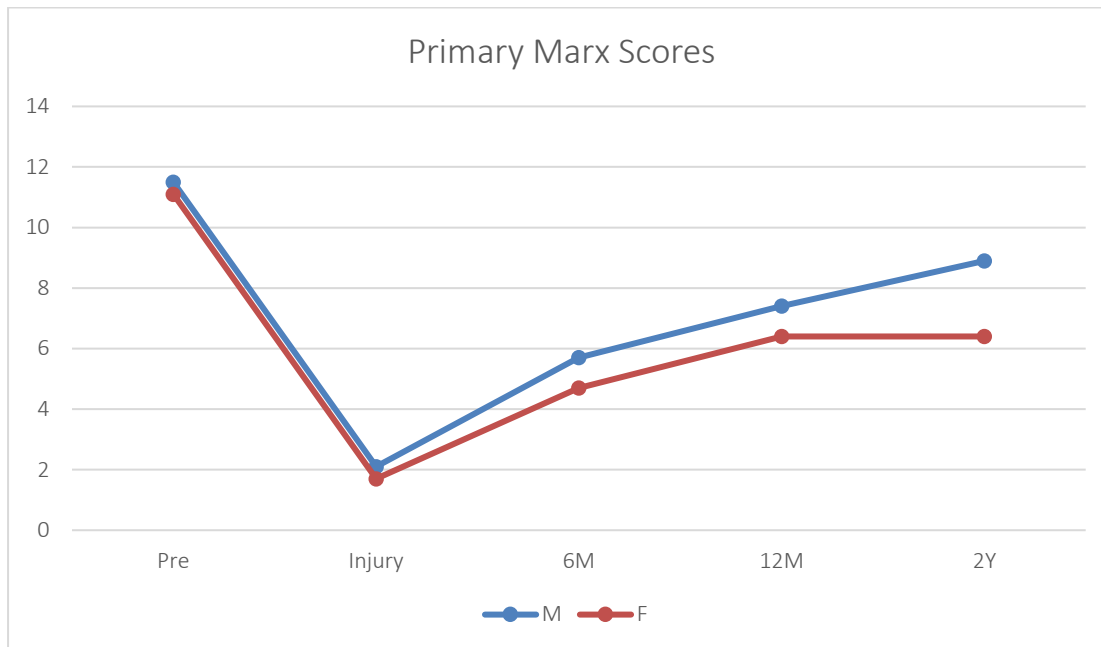


The scores in our cohort over time are very similar to those presented in other registry data. KOOS scores show improvement over all time points in primary ACL reconstruction. Revision KOOS scores show less improvement overall, in spite of a similar starting point.



**Marx Scores:**

The Marx score is a measurement of how often the individual engages in ACL-dependent physical activities including running, cutting, decelerating and pivoting. The Marx scores show a poorer return to activity after revision surgery when compared with primary ACL reconstruction.





**Conclusions:**

The Registry is well on track to producing a high quality and robust data set. This will enable us to generate meaningful information on patient outcomes and research into the variables of ACL injury and reconstruction. Our primary goal of being able to improve the quality of patient care in the management of ACL injuries remains on track.

The Trustees of the ACL Registry wish to express their gratitude to all participating Surgeons and to the New Zealand Orthopaedic Association, in particular its Knee Society, for making the ACL Registry possible.