New Zealand ACL Registry

Annual Report 2018

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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.

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.

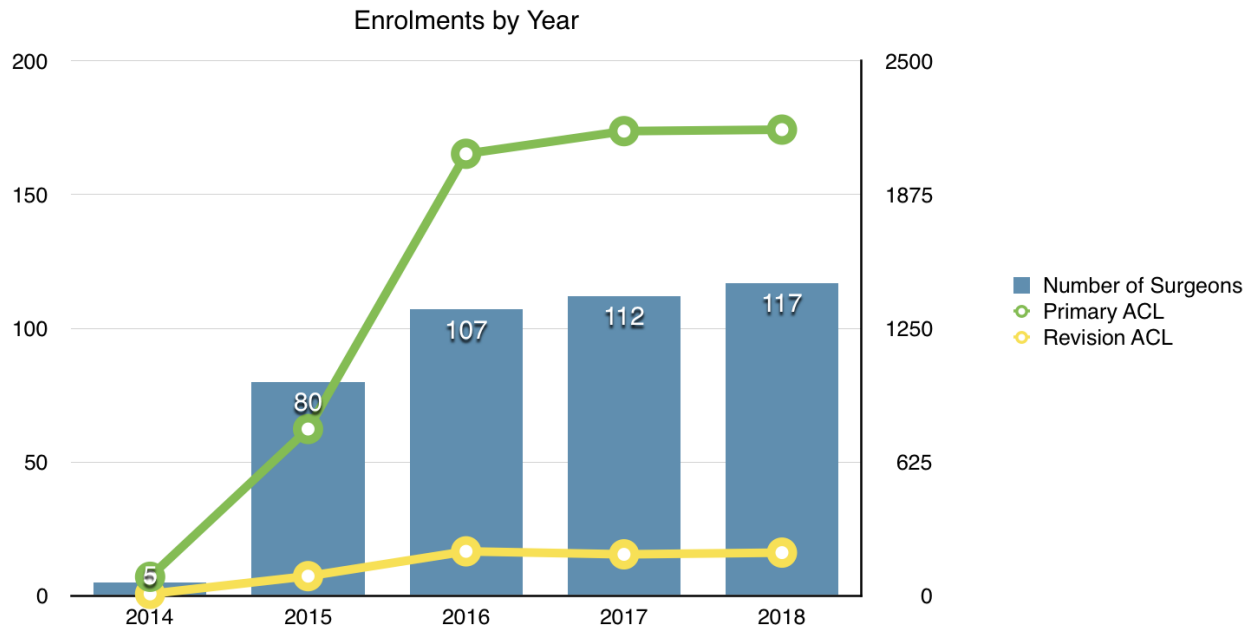
The Registry has a permanent database Administrator, Charlotte Smith and employs a part-time data entry assistant.

The Registry has moved to Forte Sports, Forte 2, 132 Peterborough Street as a permanent home.

Introduction:

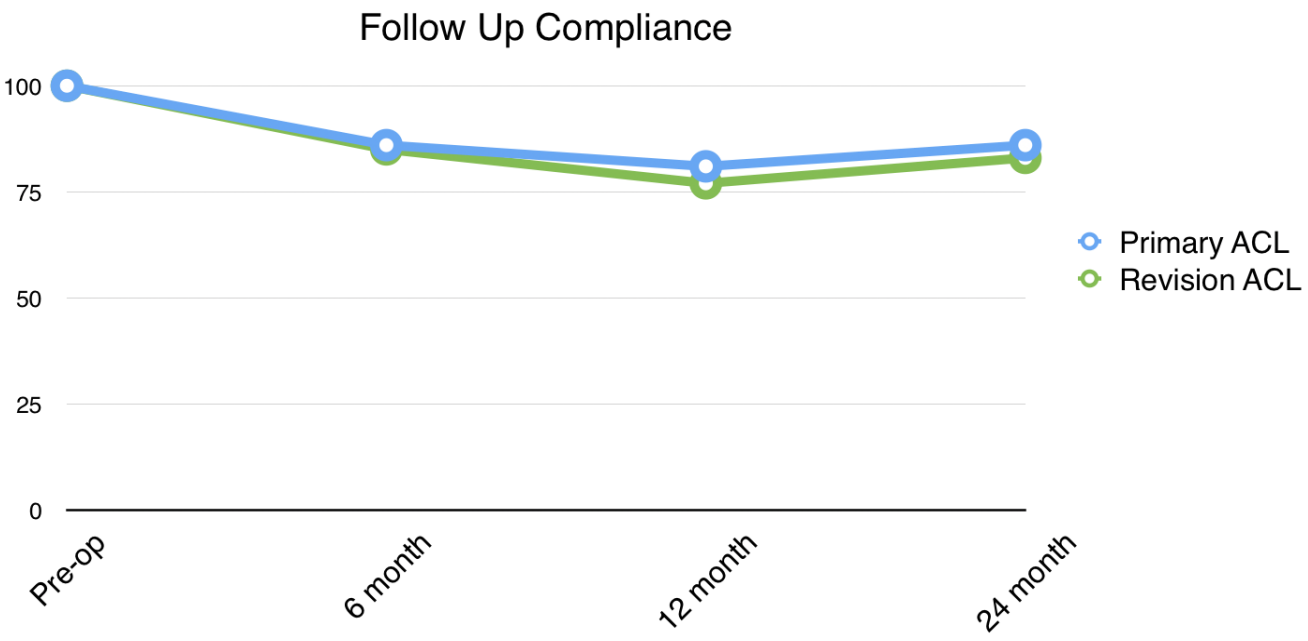
The New Zealand ACL Registry is now in its fifth year of operation. We are progressing towards our goal of capturing all ACL procedures done in New Zealand. The number of Surgeons and Hospitals involved in the Registry has been steadily growing over the last 12 months. In September 2015, there were 68 participating Surgeons, now this number is 117. For the 12 months until August 2018, 2179 new patients were enrolled in the Registry. The numbers through the year continued to grow, and we estimate we are now enrolling around 70% of the estimated 3000 ACL reconstructions performed in New Zealand each year. As at 16 August 2018, 7590 patients have been enrolled in the ACL Registry.

The NZOA Executive has now made participation in NZOA approved registries mandatory. All surgeons who perform ACL reconstruction must actively participate in the ACL registry to fulfil their CME requirements. We expect this change will increase our capture rate to over 85% of all reconstructions. We have applied for Protected activity status to the Ministry of Health. The NZ Joint has needed to reapply for their Protected activity status. At present both registries are waiting for their applications to be approved.

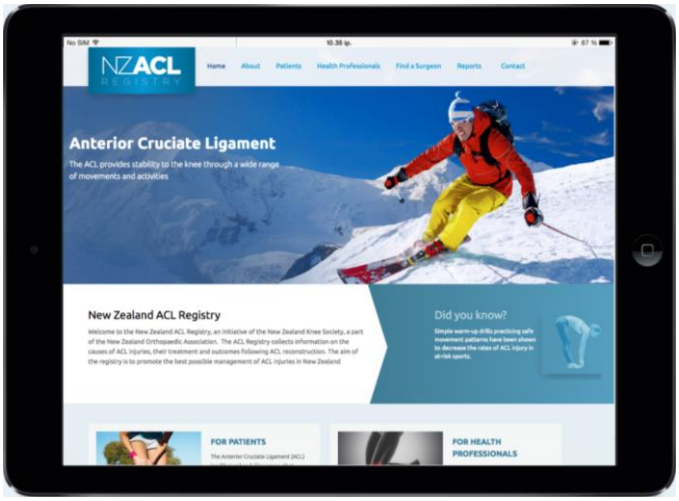


Data set integrity:

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 over 80% follow up at the two year mark for our primary ACLs and better than that at all preceding time points. There are some issues with getting patients to complete all sections of all forms, resulting in some incomplete data sets. We are confident that patient reporting of significant complications is being completed.



The Registry Trust has a stand-alone ACL Registry website. The site contains patient information regarding ACL injuries and the ACL Registry. Research generated by the registry and annual reports are available on-line. Additionally, it provides a link for patients to contact the Registry if required.



Surgeon resources on the website:

- Enter complications directly on-line while in clinic or by the enclosed form. This feature increases the ease of reporting on post-op complications or graft ruptures. Accurate collection of this data is critical for the validity of the registry.
- Downloadable registry forms. Hospital or clinic staff can print out registry enrolment forms.

Future directions:

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.

Upcoming research projects:

The New Zealand ACL Registry is pleased to be involved with providing data that leads to quality research in ACL injuries and their treatment. As at the beginning of August 2018, this was 1025 patients who were 6 months post-operative, 2182 who were 1 year post-op and 3538 that were 2 years post-op.

The data set is now reaching numbers where meaningful research can be completed.

Current projects include:

- Validation of an Abbreviated Patient Reported Outcome Measure for use in ACL Patients
- Does fully funded rehab change outcomes after ACL reconstruction? Results of the ACL POC Study (Andrew Vincent)
- Does a thicker hamstring or patella tendon graft reduce the failure rate in young patients? (Mark Clatworthy)
- Does a thicker hamstring graft reduce failure in ACLR?
- Patients frequently change surgeon when undergoing revision ACL reconstruction (Simon Young)
- A retrospective analysis looking at the impact of peripheral nerve blockage on intermediate term (six to twelve month) quadriceps function after ACL reconstruction. (Matt Boyle)
- RCT comparing hamstring and quadriceps tendon grafts for ACL reconstruction. (Mike van Niekerk).
- Are there ethnic variations in the surgical management and outcomes for ACL injuries in the New Zealand population? (Hamish Love)
- Variables effecting return to pre-injury activity levels after ACL reconstruction (Hamish Love)
- Masters student from Auckland University 2019 (Supervisor Simon Young)

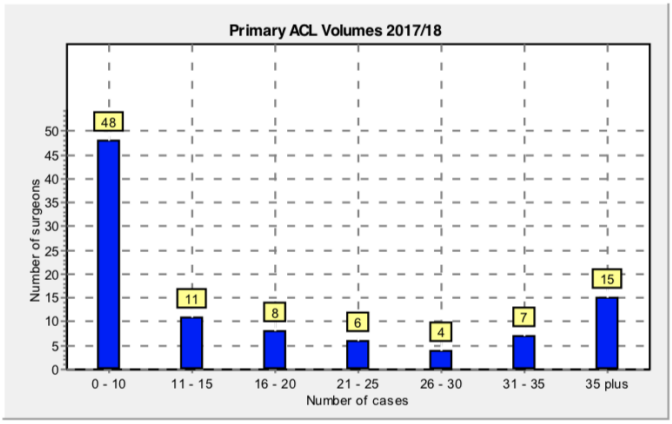
Results:

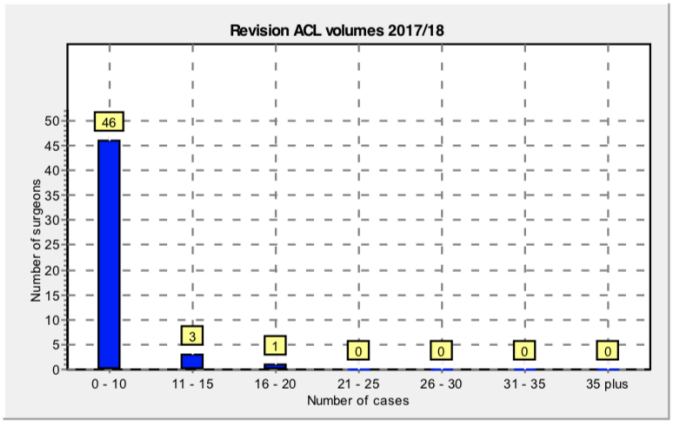
As of 16th of August 2018, 7590 patients have been enrolled in the ACL registry.
6890 primary and 700 revision ACL reconstructions were recorded.

Case volume by hospital:

Hospital	Number	Percent
SX Christchurch	528	7
St Georges	481	6.3
Royston	126	1.7
Manuka Street	237	3.1
Wakefield	245	3.2
Mercy Dunedin	171	2.2
Selina Sutherland	24	0.3
Bowen Hospital	181	2.3
SX New Plymouth	182	2.3
SX Wellington	312	4.1
SX North Harbour	500	6.9
Southland Invercargill	8	0.1
SX, Invercargill	203	3.1
SX, Hamilton	315	4.1
Belverdale	78	1
Mercy/Ascot	1339	17.8
SX, Rotorua	68	1
SX, Brightside	58	0.7
Crest	3	0.1
Grace	181	2.2
Forte	553	7
Auckland Surgical Centre	1180	15.5
Anglesea	66	1
Churchill	68	1
Chelsea	34	0.5
Bidwell	122	1.8
Braemar	215	3
Kensington	34	0.5
SX Napier	1	0.1
Starship	1	0.1
SX Palmerston North	1	0.1
Whangerei	1	0.1
Wanganui	1	0.1
Northshore	1	1
Ormiston	37	0.5
Masterton	10	0.2
Northland Orthopaedic Centre	13	0.2

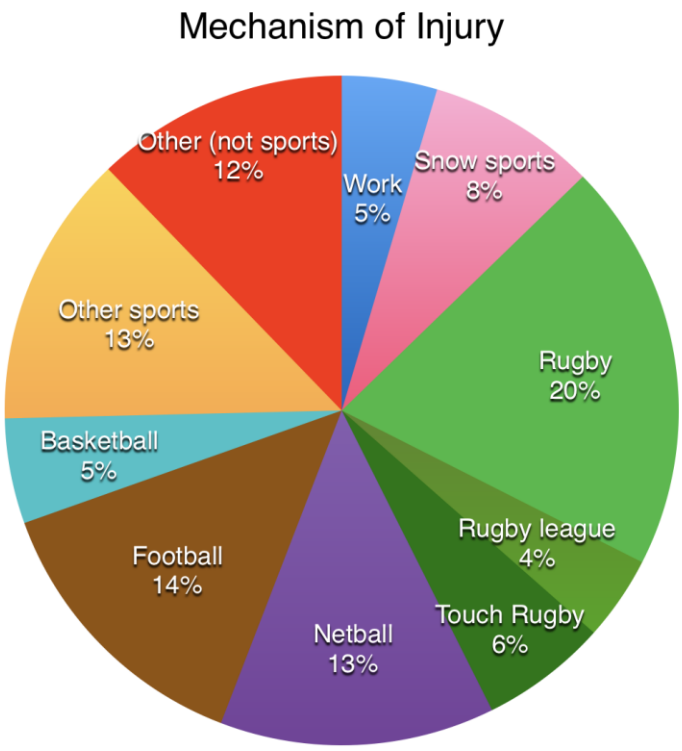
Case volume by surgeon:





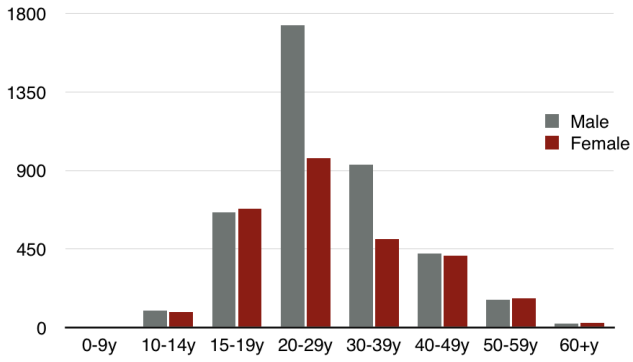
Mechanism of Injury:

Rugby, in its various forms, remains the most common mechanism of injury (30% of patients), with football (14%), netball (13%) and snow sports (8%) being the other common codes.

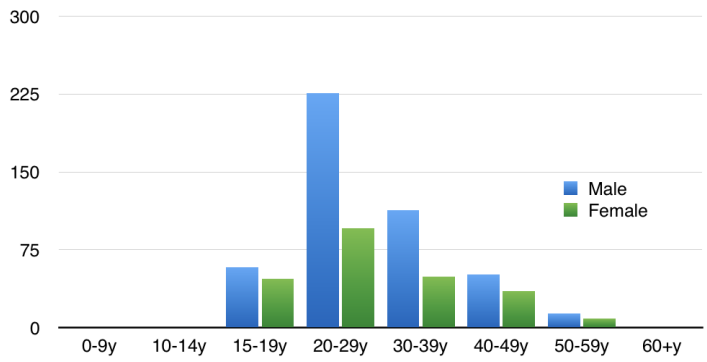


Demographics:

	Primary ACL Reconstruction	Revision ACL reconstruction
Male: female	4038:2852 (58.6% male)	464:236 (66% male)
Average age at surgery	29.1y (8.5-69.9y)	29.2y (13.1-63.6y)
Delay to surgery	10.1 months	17.9 months



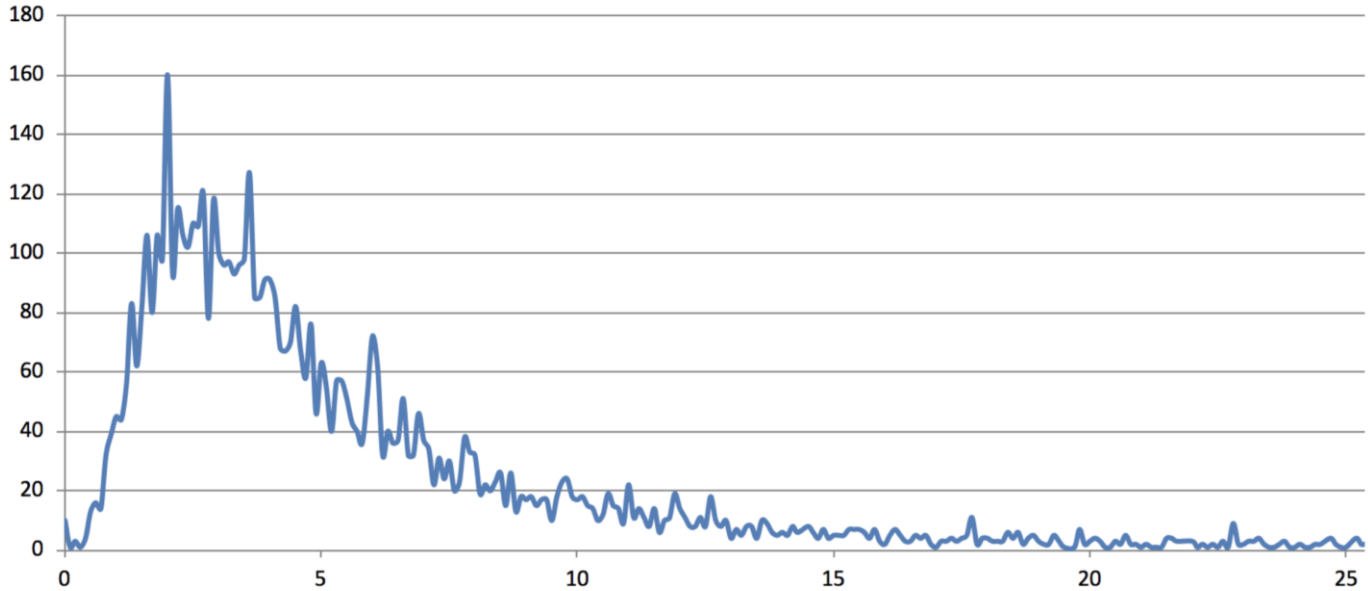
Age distribution: Primary



Age distribution: Revision

The majority of patients receive a primary ACL reconstruction within 6 months of injury. Median time is around 5 months. The long tail on the curve pushes the average time out to 10.1 months.

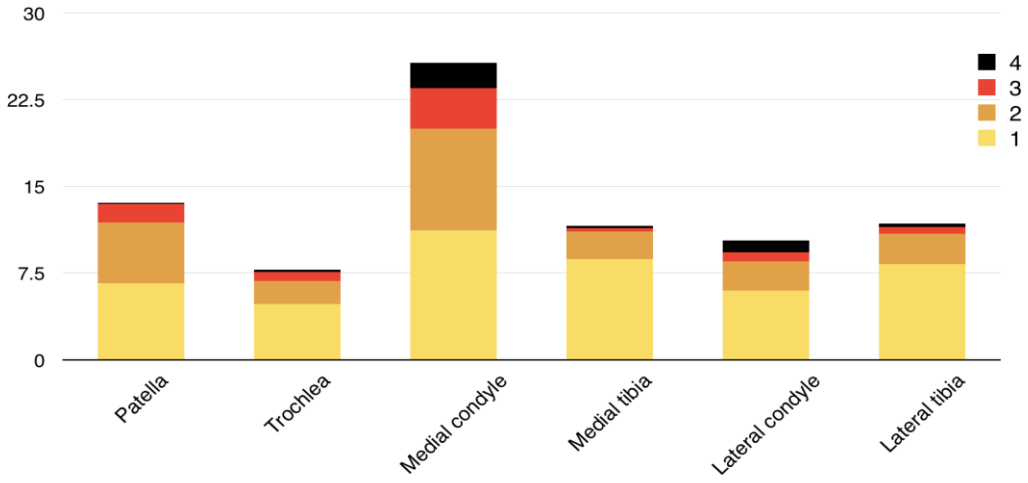
Delay to Surgery



Chondral injury:

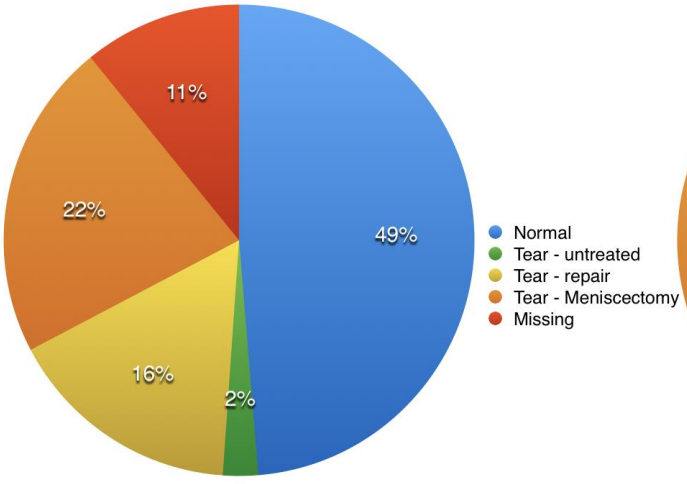
Chondral injuries were common at the time of surgery, the most frequently and severely affected area was the medial femoral condyle, being damaged in 29.3% of cases, it was also the area most frequently associated with higher grade chondral injuries (ICRS grade 3 and 4).

The majority of the injuries were not treated (76.1%). Chondroplasty was completed in 5.7% and microfracture in 2.9%. The chondral treatment field was not completed in 14.1% of operative data forms.

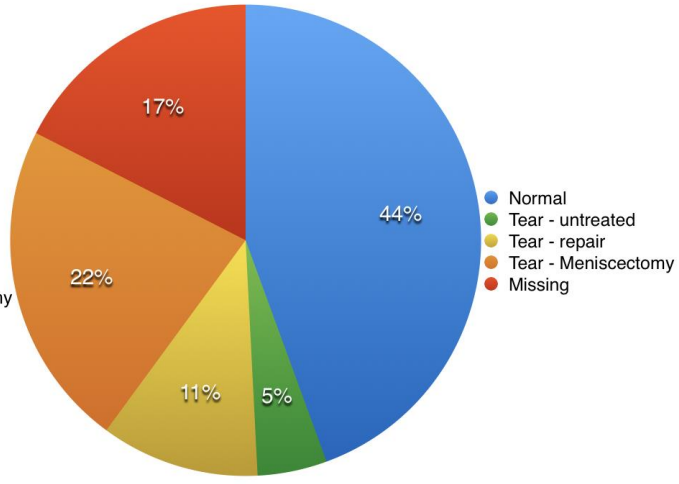


Meniscal injury:

About 1/3 of menisci have significant tears requiring treatment at the time of ACL reconstruction (36% medial, 33% lateral). The meniscus are found to be similarly reparable on the medial and lateral sides (22%). Implants are used twice as frequently as the more traditional sutures techniques on both sides of the knee.



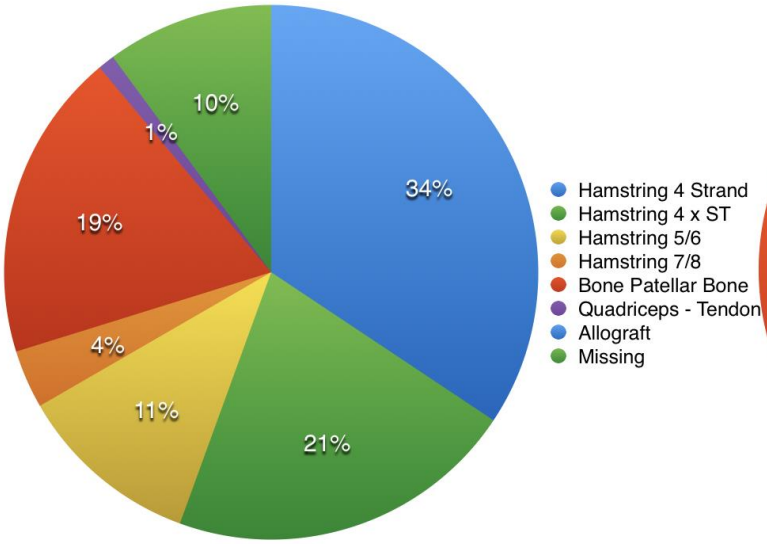
Medial meniscus



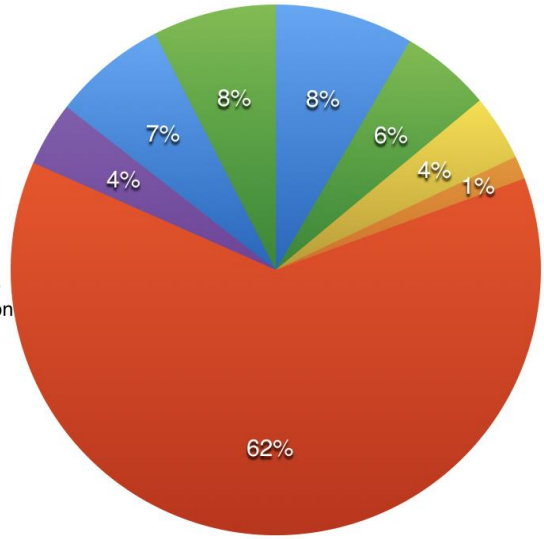
Lateral meniscus

Graft Choice:

For primary ACL reconstruction, the predominant graft choice is hamstring, accounting for 69.5% of all primary ACLs. 34% are 4 strand grafts with semitendinosis and gracilis. The majority of the others are quadrupled semitendinosis grafts (21%), although there is a trend for an increasing use of 6 to 8 strand grafts (14.5%). BTB is the next most popular graft, making up 18.5% of primary ACLs.



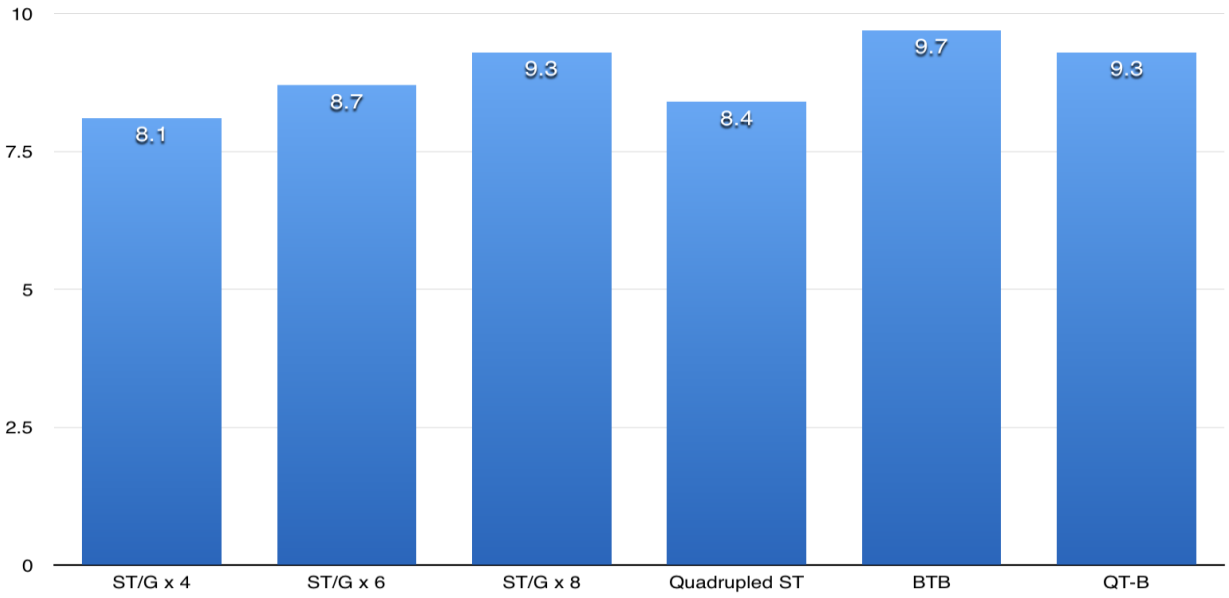
Graft choice: Primary



Graft choice: Revision

Graft diameter by graft choice:

At this point, there has been an increase in all graft sizes compared with 2017. The graft decrease is by up to 1.7 mm per graft type with the largest increase being Quadriceps bone with a difference of 7.6mm to 9.3mm.



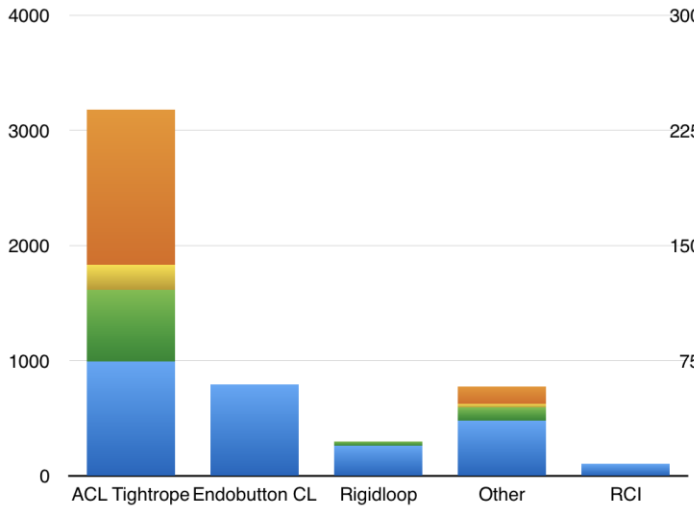
Tunnel drilling technique:

Tibial tunnel drilling data indicates that all are completed with antegrade drilling techniques. However, the operative data form was not completed in 12.5% of cases. 5 physeal sparing cases were recorded.

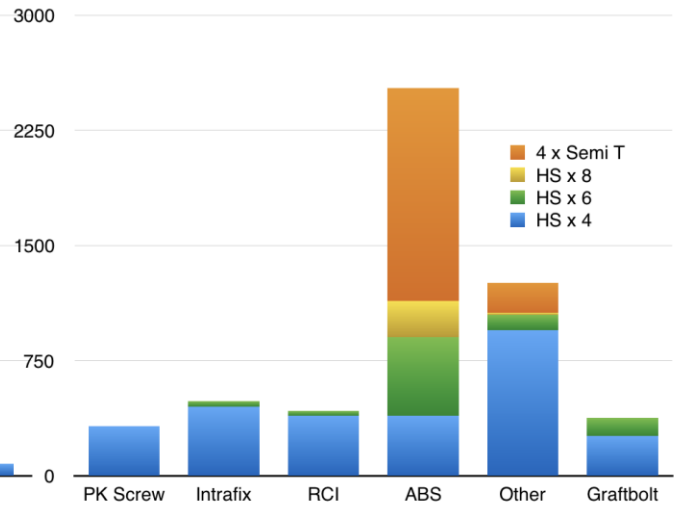
Femoral tunnel drilling was via an anteromedial portal in 71.5% of cases, transtibial in 12.3% and outside-in with a Flipcutter technique in 1% of cases. Data was missing in 15% of cases.

Graft fixation technique: Hamstring Primary Patients

Femoral fixation

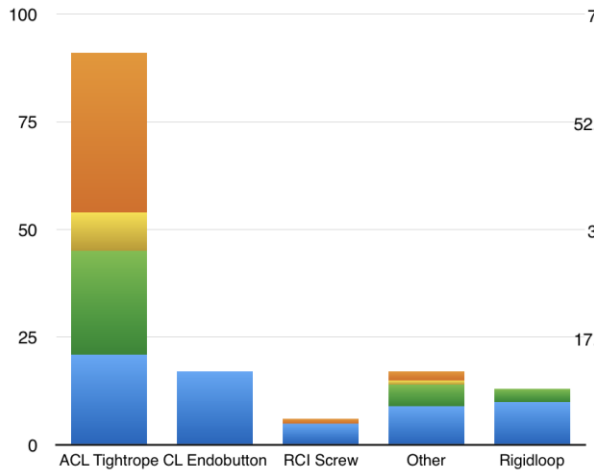


Tibial fixation

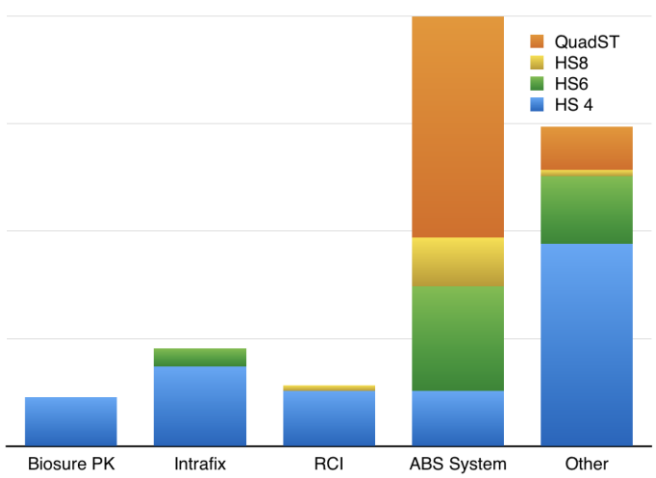


Graft fixation: Hamstring Revision Patients

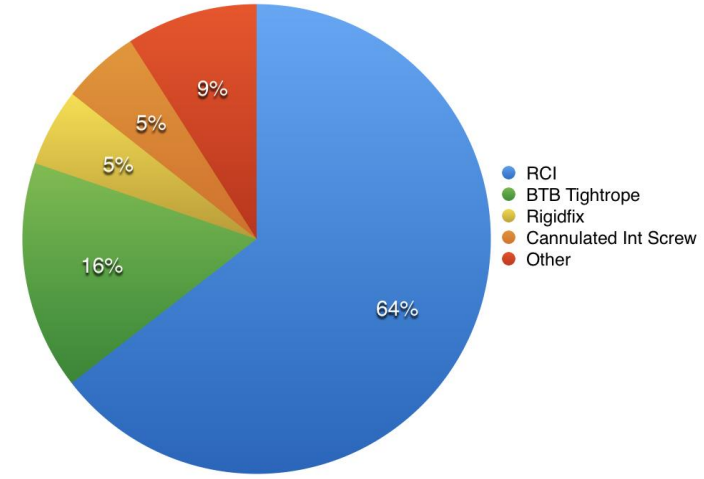
Femoral fixation



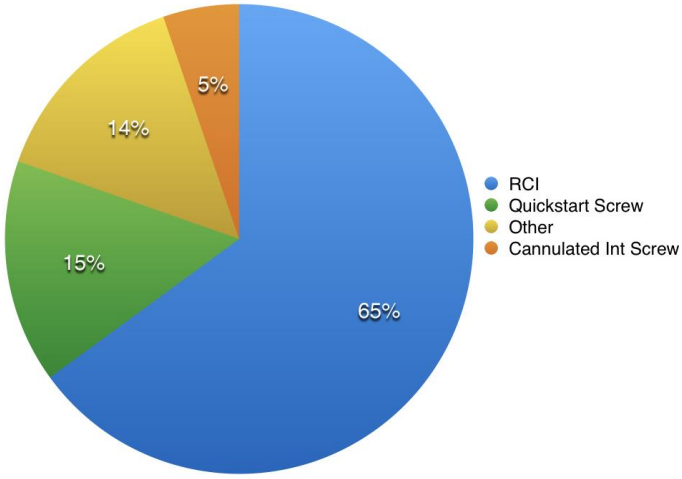
Tibial fixation



Graft fixation: Patellar tendon Primary Patients

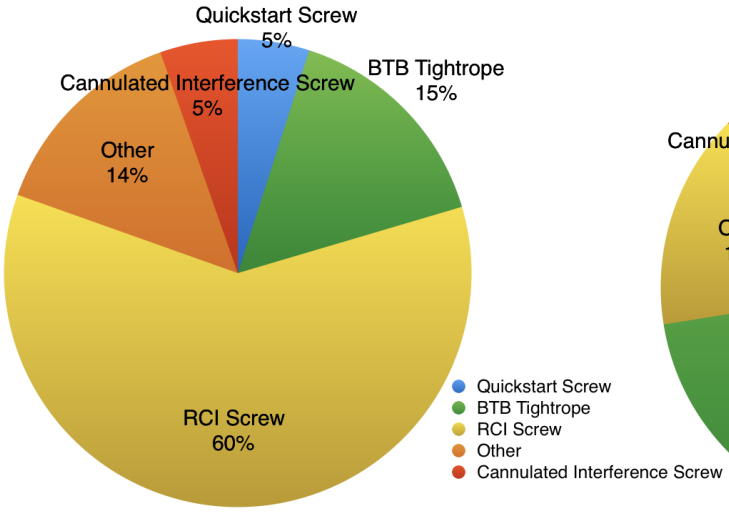


Femoral fixation

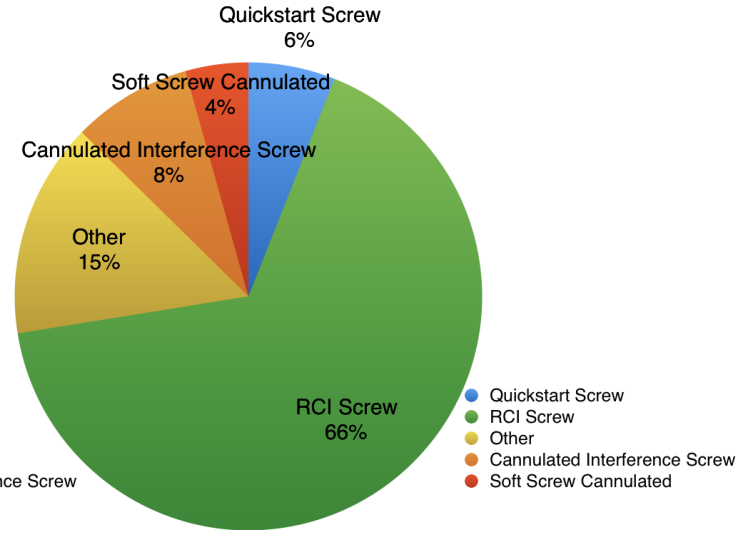


Tibial fixation

Graft fixation: Patellar tendon Revision Patients



Femoral Fixation



Tibial Fixation

Antibiotic use:

Cephazolin	79%
Cefuroxime	1%
Augmentin	2.5%
None recorded	15%

Thromboprophylaxis:

None	75%
Aspirin	9.5%
TEDs	6%
Footpumps/SCDs	6%
Clexane	3.5%

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.

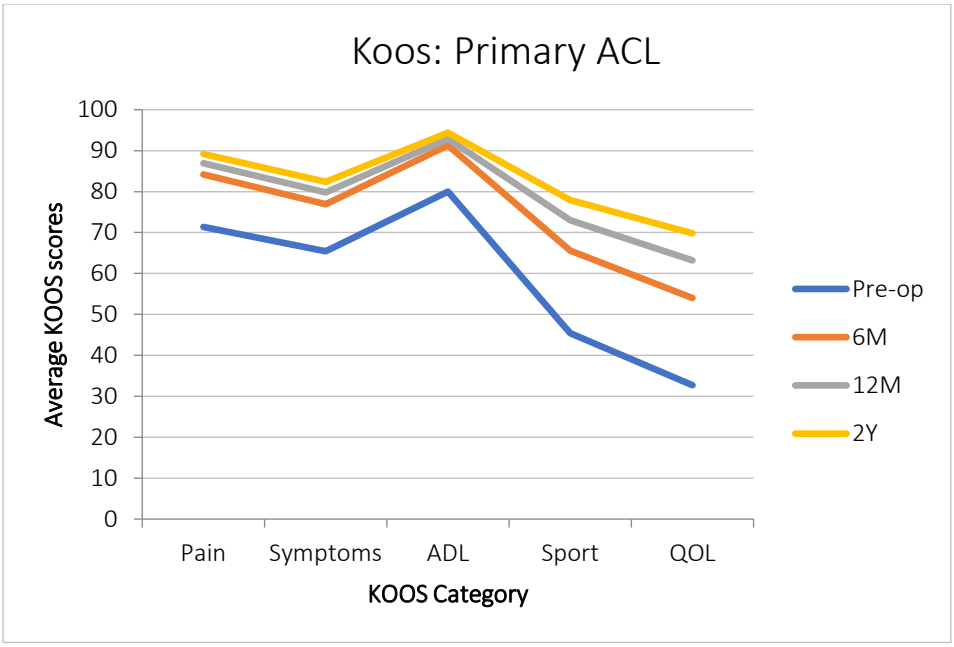
	Primary ACL (n)	Revision ACL (n)
Intraoperative complication		
Implant failure	79	7
Hamstring Amputation	9	-
Inadequate Graft	22	1
Other	80	10
*Post-operative complication**		
Infection	20	5
DVT	27	1
Arthrofibrosis	67	6
Implant-irritation/removal	9	5
Other hospital admission	17	7
Meniscal tear	53	5
Donor site problem – hamstring**	83	9
Donor site problem – patella**	42	6
Recurrent instability		
Atraumatic	37	5
Traumatic	94	5
Other / not recorded	27	2
Patients with recurrent instability requiring revision ACL reconstruction:	118	9

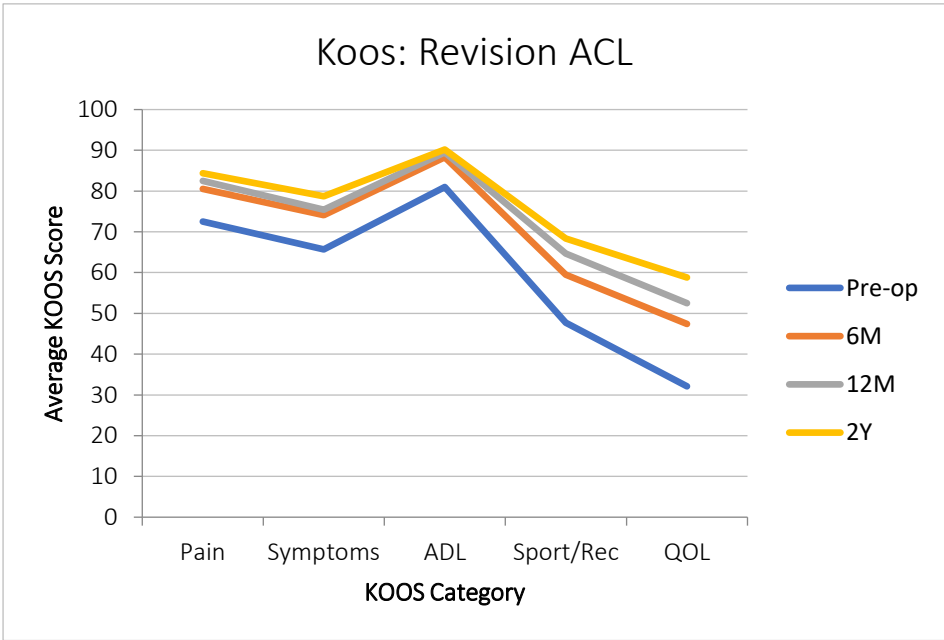
* Complications are recorded if they are significant to require hospital readmission or reoperation.
**The exception to this is donor site problems. These are listed if the patient reports significant symptoms related to the graft harvest site.

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.

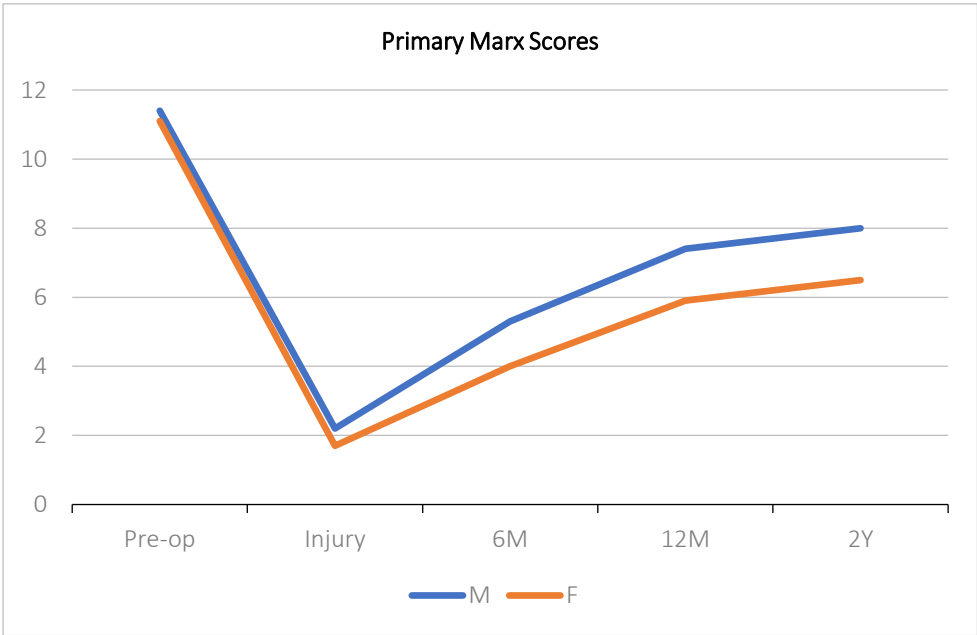


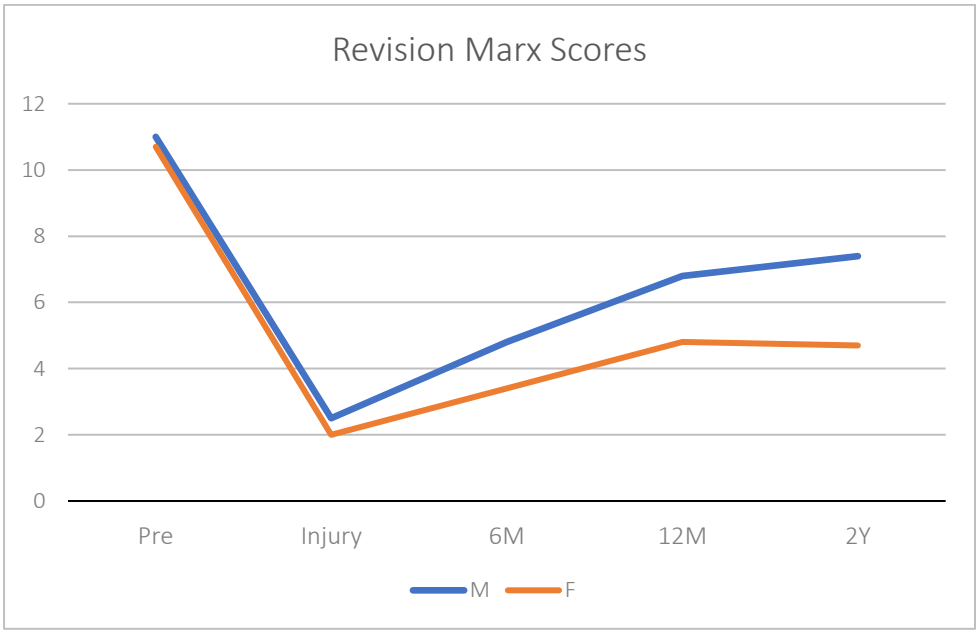


The scores in our cohort over time are very similar to those presented in other registry data. KOOS scores show improvement over all time points in primary ACL reconstruction. Revision KOOS scores show less improvement overall, in spite of a similar starting point.

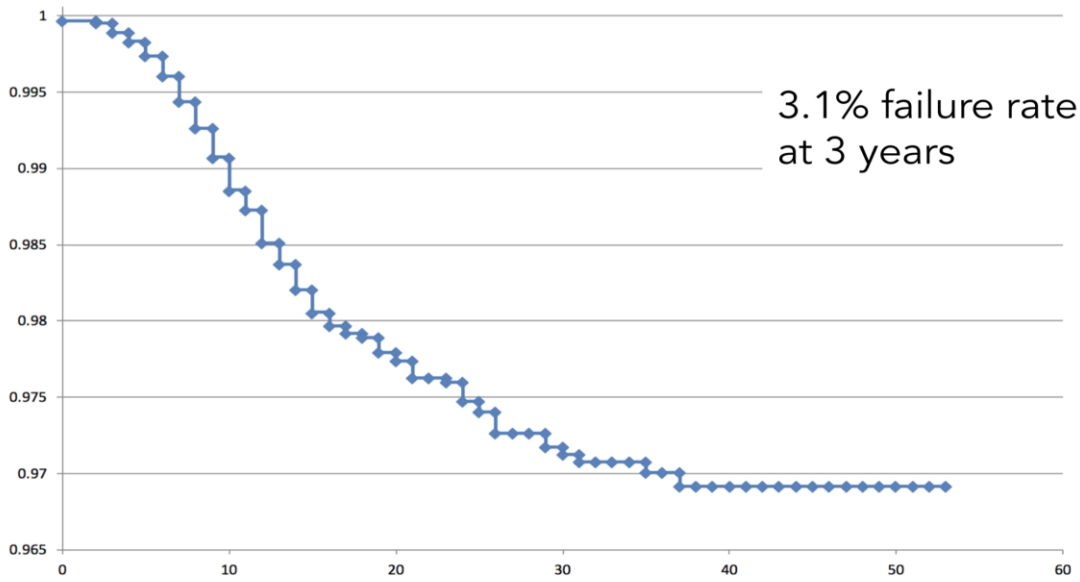
Marx Scores:

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.





Survivorship:



Conclusions:

The Registry is 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 is to improve the quality of patient care in the management of ACL injuries.

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.