

Multi Ligament Injuries: Repair or Reconstruct in acute cases

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VI d'Iserre Knee Course
2018

Multi ligament Knee Injuries

Should we reconstruct / repair / repair and augment

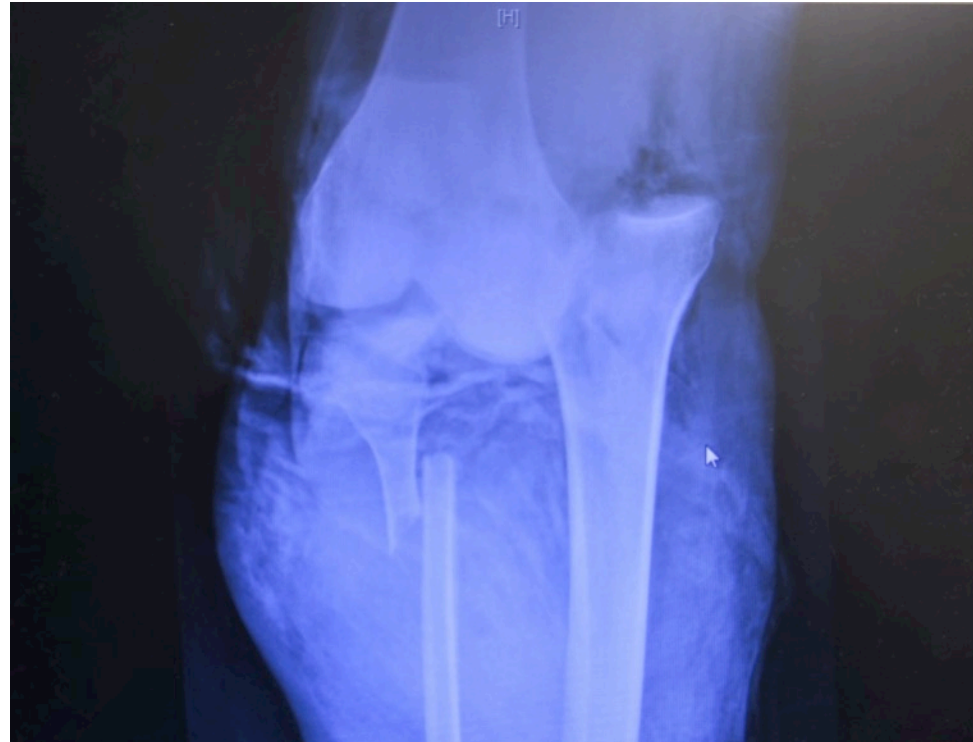
Medial structures

Lateral structures

Posterolateral corner

Cruciate avulsions

- * Personal approach
- * Literature
- * Results -SORI
- * Conclusions



Clinical Presentation

- * History of high energy mechanism
- * May be dislocated
- * Pain / Swelling / Deformity
- * Neurovascular Compromise
- * Associated Injuries
- * Require full assessment



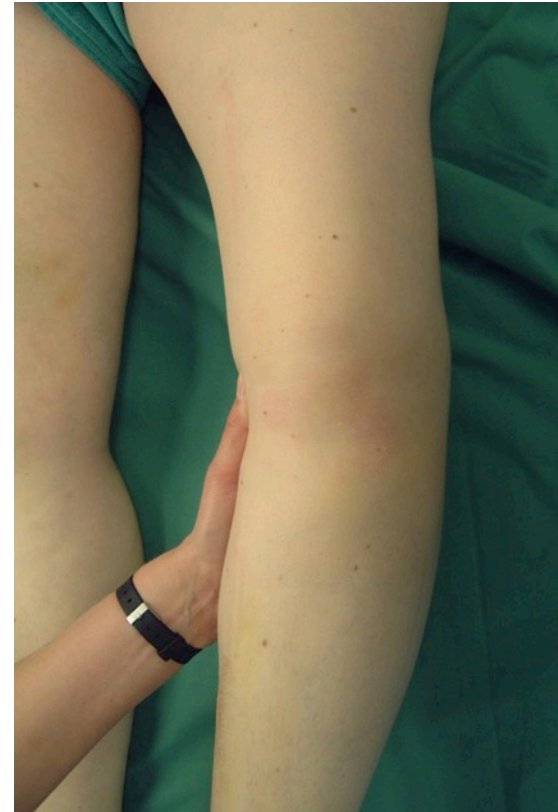
Acute Management

- * History / Mechanism
- * Local examination
 - * Knee
 - * Compartments
 - * Neurovascular status
- * Associated Injuries
- * Splinting
- * Imaging

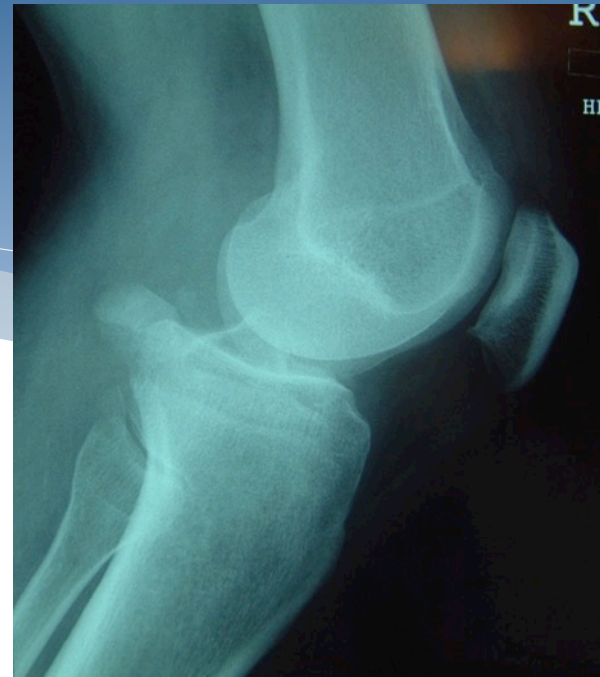


Ligament Assessment

- * Coronal instability in extension
- * Selective examination
 - * ACL
 - * PCL
 - * MCL / PMC
 - * LCL / PLC



Imaging-Plain Films



Imaging-MRI

- * Opposite bone oedema
- * Sites of disruption
 - * Mid substance
 - * Avulsion
 - * Guides Surgery

Chondral and meniscal
Patterns of disruption



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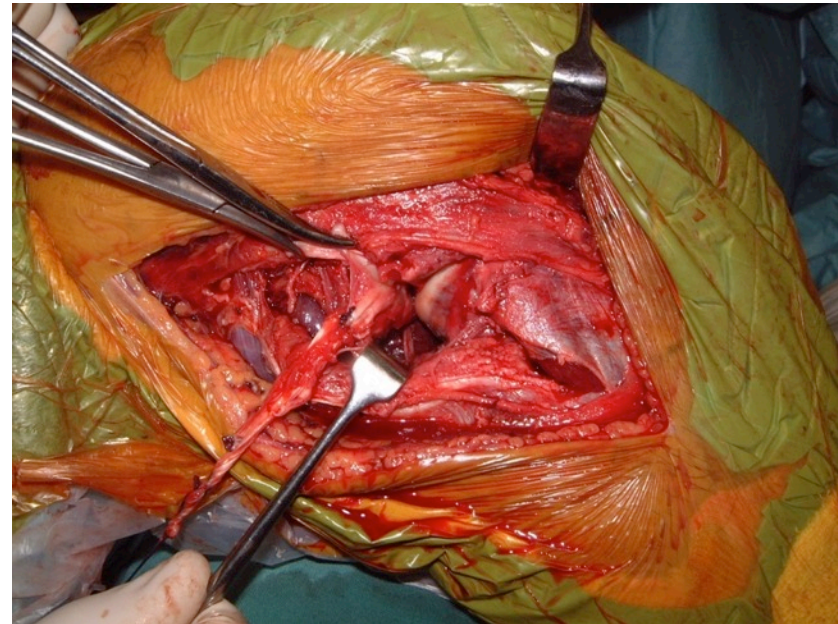
Chondral and meniscal
Patterns of disruption



Plan for Definitive Management

When appropriate depending on other issues

- * Order specialised equipment
- * Allograft
- * Artificial ligaments
- * Plan OR time
- * Experienced assistants



Repair vs Reconstruction

- * Cruciate ligaments
 - * Repair avulsions +/- augment
 - * Reconstruct midsubstance
- * Repair & reconstruct collaterals
- * Support for collateral reconstruction
 - * Higher failure rate with PLC repairs vs recon
 - * Higher return to sports
 - Stannard et al , AJSM, 2005
 - Mariani et al, Am J Knee Surg, 1999
 - * Augment PLC repairs except bony avulsions
 - * Augment medial if poor tissue
 - * Consider alignment



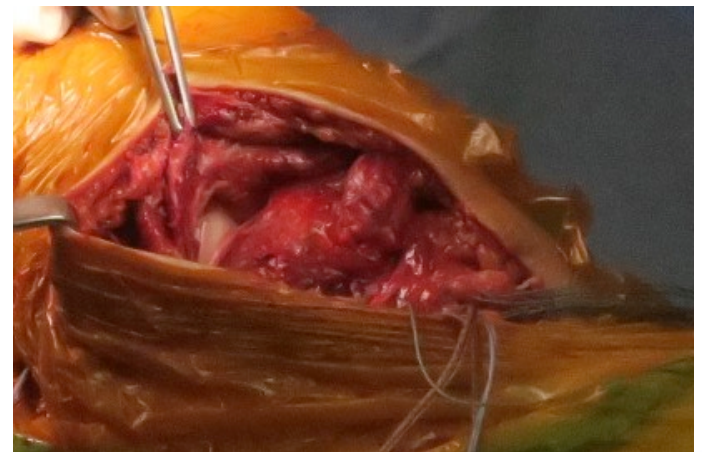
Graft Choices

- * Autograft: Hamstring mainly
 - * Ipsilateral & Contralateral
 - * Preserve ipsilateral in medial injuries
- * Allograft
 - * Non-irradiated soft tissue
- * Synthetic
 - * Mostly for extra-articular augmentation
 - * Preferably avoid intra-articular use
 - * Must be isometric
 - * LARS
 - * Internal Brace & Swivelock



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Review of the Literature

Evidence-Based Medicine Series Systematic Review

Decision Making in the Multiligament-Injured Knee: An Evidence-Based Systematic Review

Bruce A. Levy, M.D., Khaled A. Dajani, M.D., Daniel B. Whelan, M.D.,
James P. Stannard, M.D., Gregory C. Fanelli, M.D., Michael J. Stuart, M.D.,
Joel L. Boyd, M.D., Peter A. MacDonald, M.D., and Robert G. Marx, M.D., F.R.C.S.C.

Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 25, No 4 (April), 2009: pp 430-438

Levy et al, 2009

(Systematic Review)

- * Op vs Nonop:
 - * Operative treatment → improved outcomes
- * Repair vs Recon
 - * Reconstruction of cruciates & PLC improves clinical outcomes
 - * Repair of PLC → higher failure and revision rates
- * Timing of surgery
 - * Within 3 weeks improves outcomes

Cox & Spindler (2008)

- * Specific attention should be focused upon the location of the primary injury site within each ligament
- * Midsubstance cruciate ligament tears are not amenable to repair regardless of the time
Reconstruction is recommended in this setting
- * Tibial or femoral-sided bone avulsions of the cruciate ligaments may be amenable to repair with screws or sutures

Cox & Spindler (2008)

- * In general, primary repair of non-cruciate ligamentous injuries (MCL, LCL, PMC & PLC) is a viable option if the surgery is performed within 21-28 days of the date of injury.
- * Reconstruction should be considered if greater than 28 days has passed.
- * The surgeon should be prepared at the time of planned primary repair to be able to both augment as well as reconstruct if necessary.

Stannard *et al*

The American Journal of Sports Medicine, Vol. 33, No. 6

- * Cohort study
- * 39 posterolateral corner repairs and 25 reconstructions using the modified 2-tailed technique.
- * Significantly inferior results with repair when compared with reconstruction.
- * Recommends reconstruction rather than direct repair if an immediate motion rehabilitation protocol is employed.

Richter et al (2002)

- * Retrospective study.
- * Surgical repair or reconstruction of the cruciate ligaments was superior to nonsurgical treatment.
- * Functional rehabilitation was the most important positive prognostic factor.
- * In cases of cruciate ligament avulsion, repair with transosseous fixation is a reasonable alternative to reconstruction, provided that it is performed within 2 weeks of trauma.

Frosch et al (2012)

Knee Surg Sports Traumatol Arthrosc(2013) 21:1502–1509

- * Meta-analyses, suture versus reconstruction of cruciate ligaments in knee dislocations with respect to injury pattern and rupture classification.
- * Nine studies included.
- * Suture repair of cruciate ligaments can still serve as an alternative option for multiligament injuries of the knee and achieve good clinical results, which are comparable to those of ligament reconstruction.

Summary of Literature

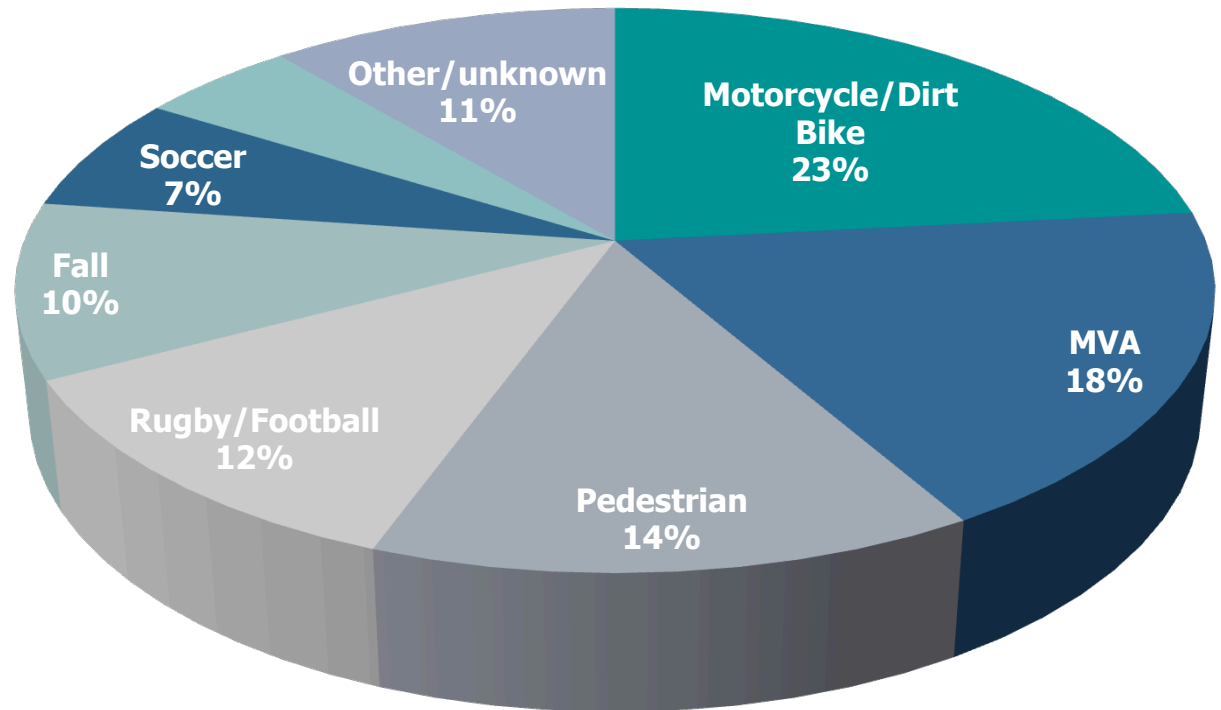
- * Operate in first three weeks
- * When patient and tissues ready
- * Reattach avulsions of cruciates +/- reconstruct
- * Reconstruct midsubstance cruciate injuries
- * Repair AND reconstruct lateral PL structures
- * Be prepared to augment medial repairs
- * No data on best material for augmentation

SORI Data

- Total number Multi Lig Knee Recons : 175
 - Primary surgeries: 172
 - Study/Clinical Findings Only: 3
- Re-operations/revisions: 23 (13%)



Mechanism of Injury



Ligament Injury Pattern

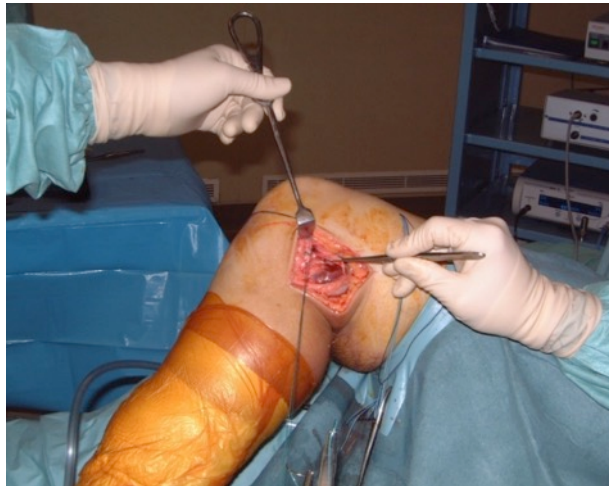
Injury Pattern	%
All	2
Cruciate Medial	22
Cruciate Lateral	26
Cruciate Medial +Lateral	2
Bicruciate Medial	23
Bicruciate Lateral	12
Bicruciate	9

Treatment

- * Non-operative in 14 knees
 - * 10 with 2 ligament injury
 - * 4 with 3 ligament injury
- * In general
 - * Older patients
 - * Low functional demands
 - * Multiple other significant injuries (eg traumatic brain injury, multi-organ injury, severe soft tissue injury)

Treatment

- * Operative treatment in 156 knees
 - * Repair 13
 - * Reconstruction 29
 - * Combination of repair and reconstruction 114



Early vs Late Sx

■ Early

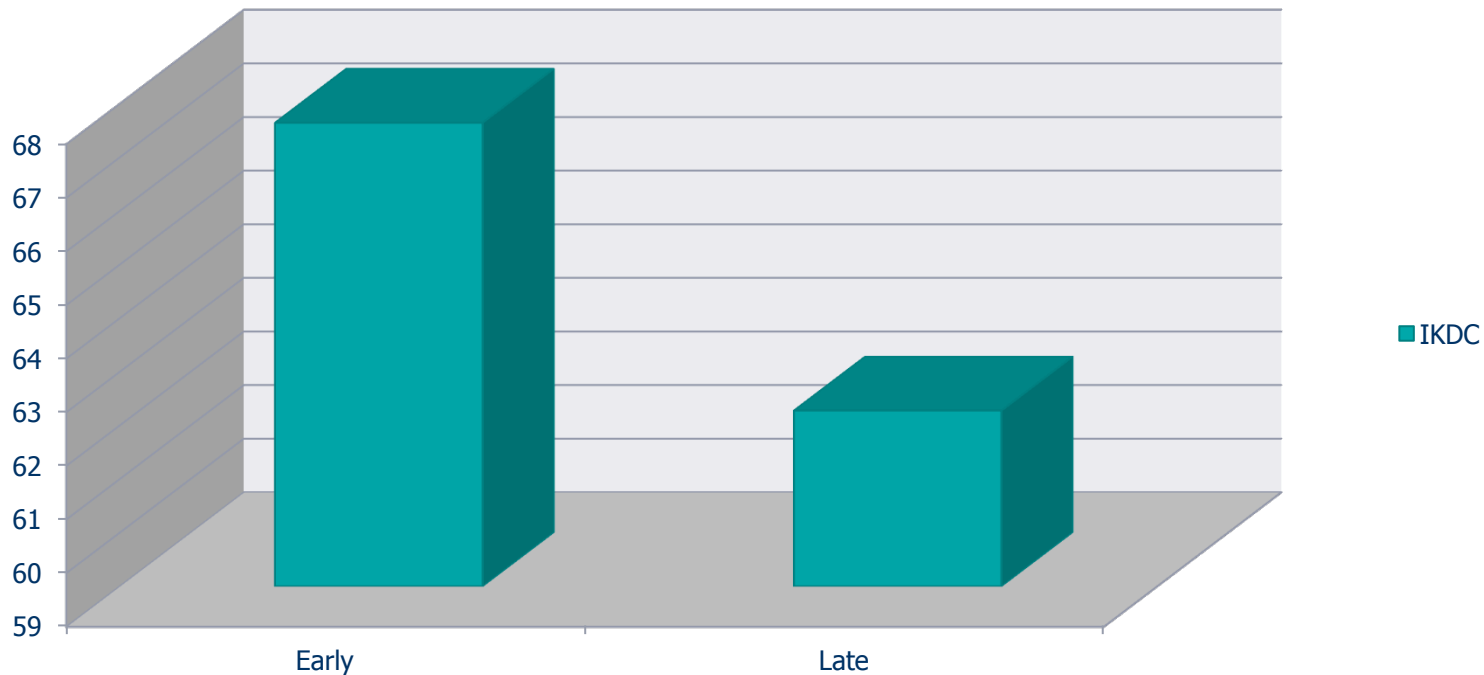
- < 3wks from date of injury
- Mean time to Sx: 9.9 days (median 9)
- Mean f/u 1498 days (4.1 yrs)

■ Late

- >3wks from date of injury
- Mean time to definitive Sx: 328 days (median 160)
- Mean f/u 1614 days (4.4yrs)

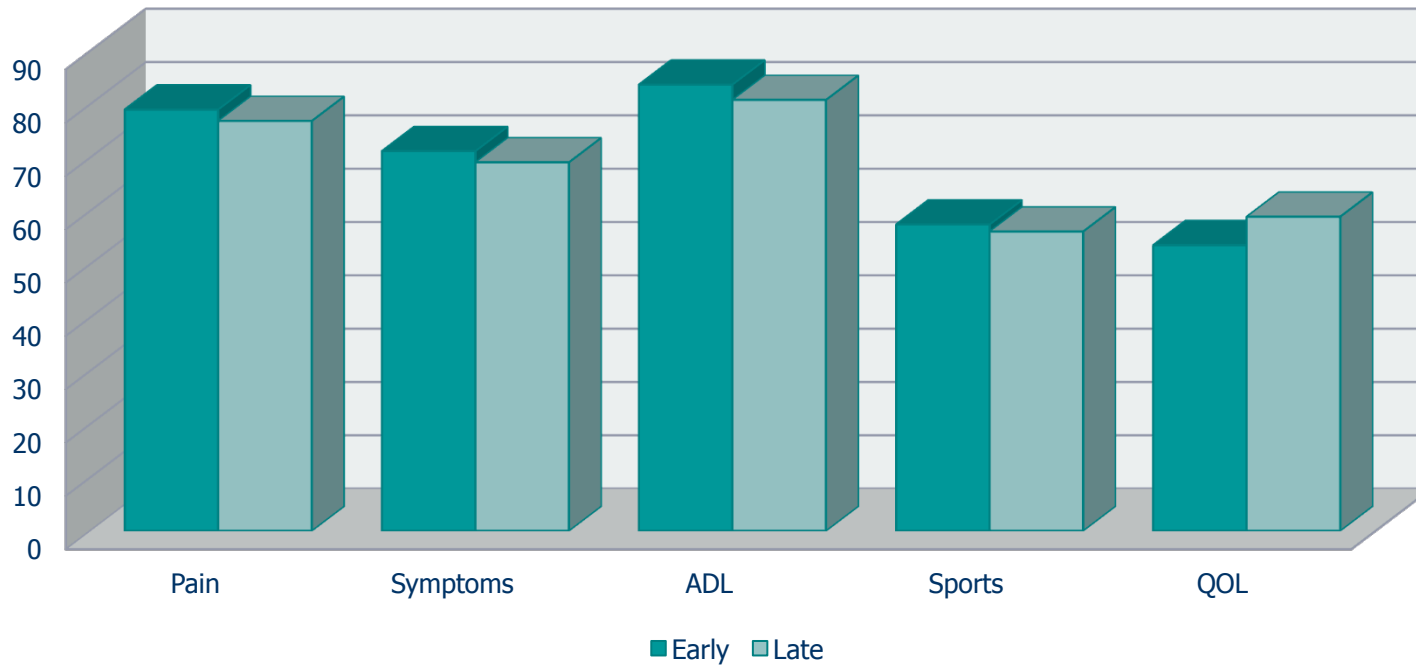
Early vs Late Sx

IKDC Scores (Mean)



Early vs Late Sx

KOOS Scores (Mean)

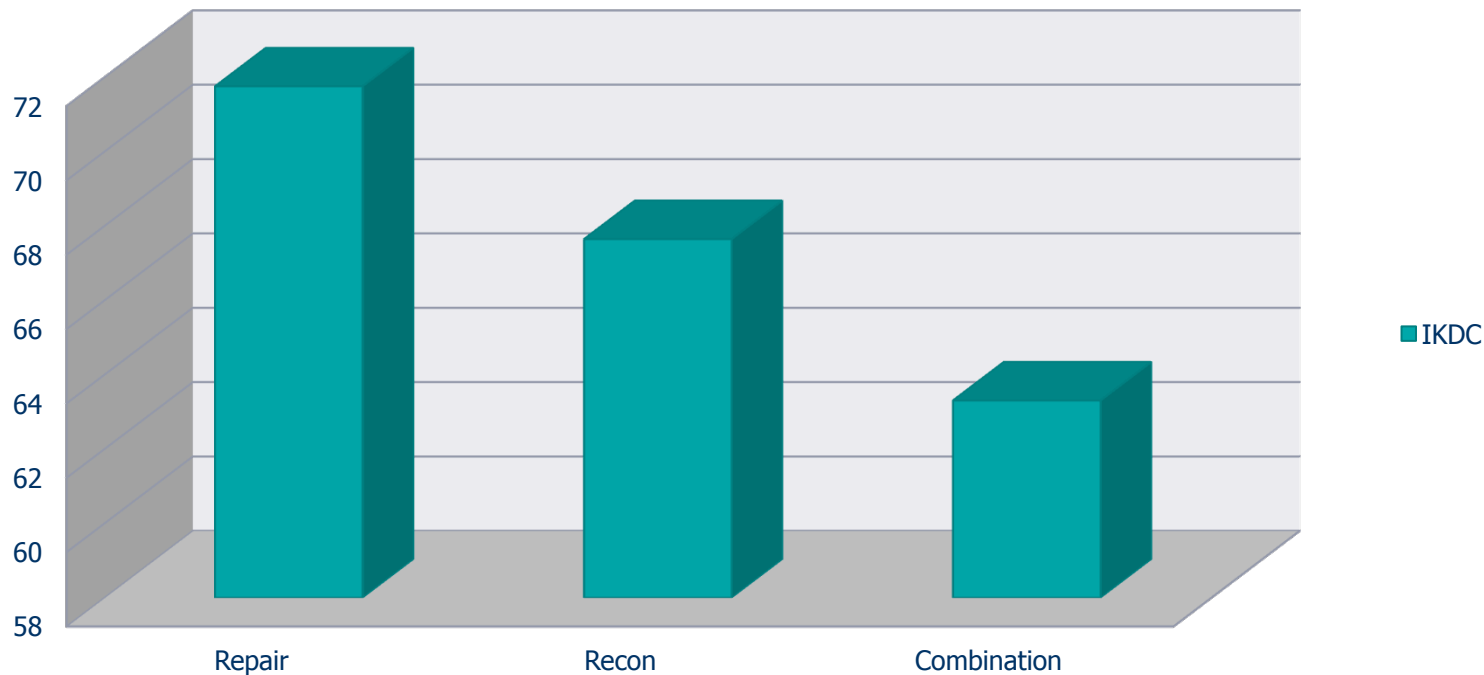


Repair vs Recon vs Combination

- * Repair
 - * Majority “bony avulsion”
 - * Mean f/u 1265 days (median 828)
- * Reconstruction
 - * Mid substance cruciates
 - * Mean f/u 531 days (median 384)
- * Repair/Reconstruction Combined
 - * Shredded collaterals
 - * Mean f/u 1904 days (median 1160)

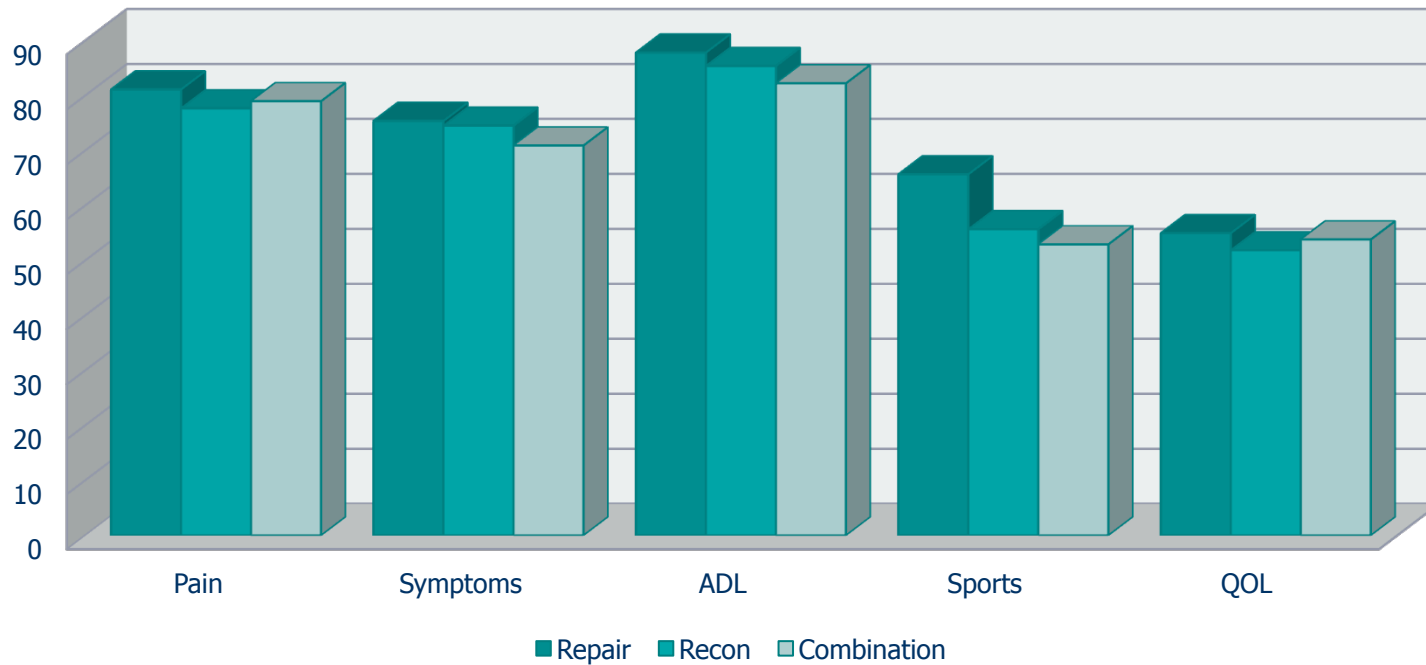
Repair vs Recon vs Combination

IKDC



Repair vs Recon vs Combined

KOOS



Summary

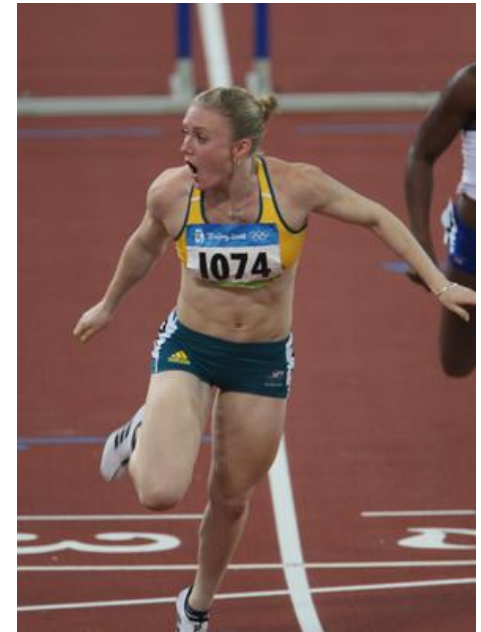
- * Major Injuries
- * High incidence of associated injury
- * Subjective outcomes scores may correlate with number of ligaments injured
- * Overall outcomes highly variable
- * Sports and QOL scores may remain low regardless of ligaments injured or treatment

Summary

- Trend towards better subjective outcomes with:
 - Surgery (vs no surgery)
 - Surgery within 3 weeks
- Better results with isolated repair in this series likely due to nature of injury
 - Mainly in setting of bony avulsion

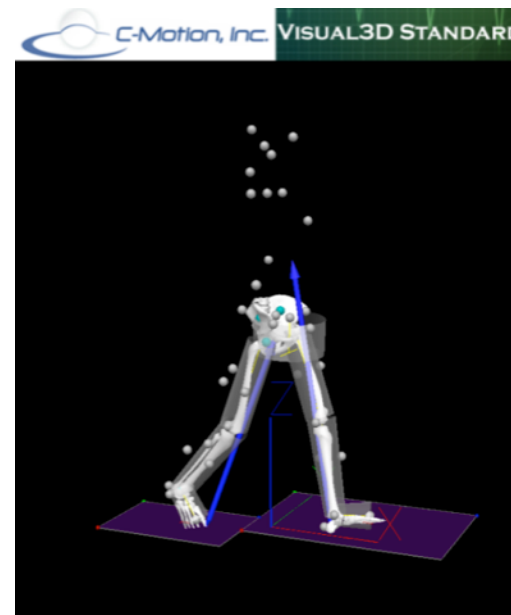
Outcomes: Conclusions

- * Good results with surgical management
 - * Good restoration ROM & Stability
 - * Invariably
 - * Loss of flexion, usually minor
 - * Grade I Laxity of 1 or more repairs
 - * no functional instability
- * Often
 - * Reduced overall level of activity
 - * Minor residual discomfort with activity
 - * Rarely feels “normal”

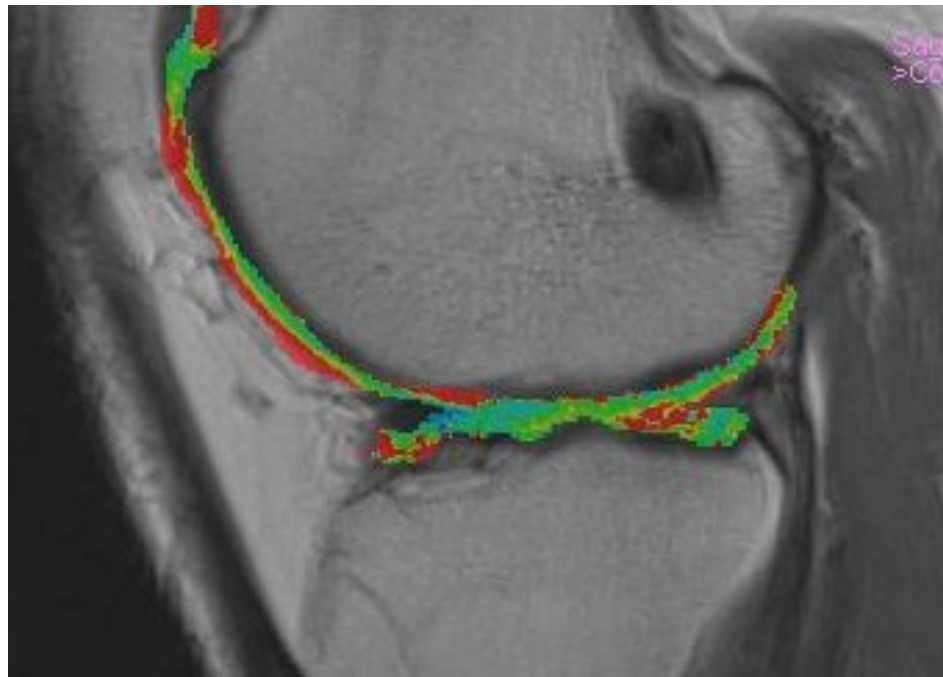


Ongoing Study

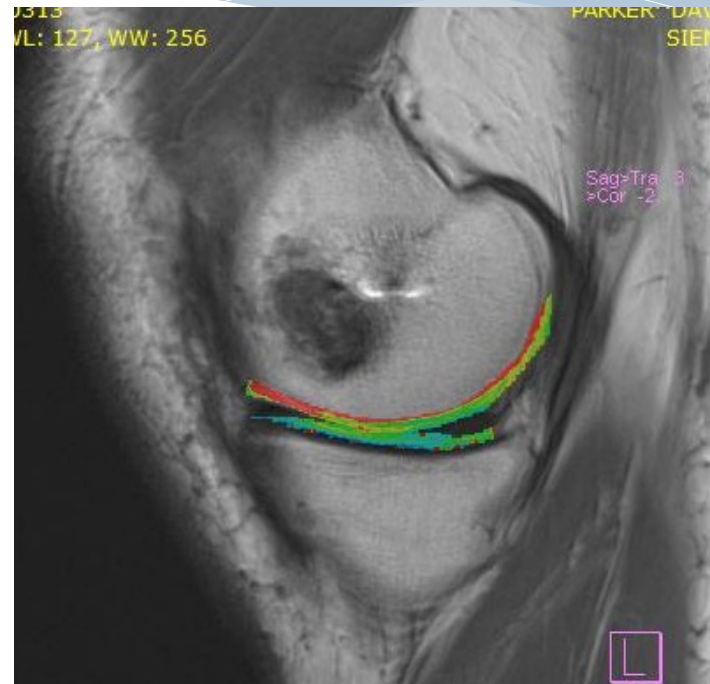
- Continue collection of subjective outcomes scores (IKDC, KOOS)
- Collection of objective outcomes scores (Surgeons IKDC)
- Analysis re patterns and predictors
- Collection of x-ray and MRI data
 - Prospective since 2011
- Gait lab analysis



MRI: T2 Mapping



Lateral



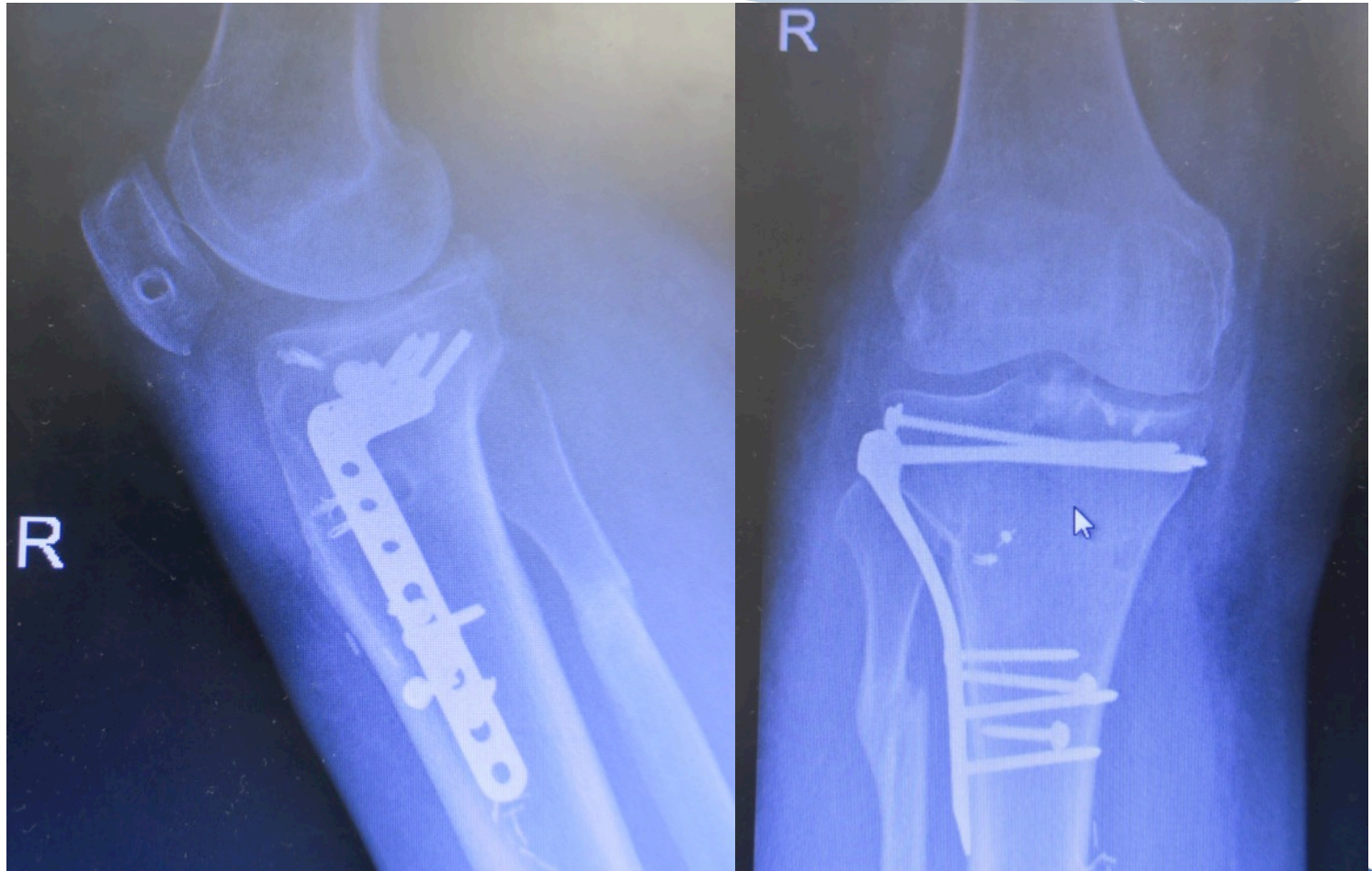
Medial

Some Final Observations...

- * Read your own MRI scans
- * Individualise management for each
- * Associated injuries have a major bearing
- * Synthetic augments must be isometric
- * No RCT for multiligaments-never will be
- * Secondary intervention for stiffness common
 - * Especially if major capsular disruption
- * Be prepared for ongoing counselling

Should we reinforce repairs?

* Yes



Thank you

