

Journal Club: 27 April 2011

Chair: Mr Dominic Meek, Consultant Orthopaedic Surgeon

Organiser: Mr David Russell, StR4 West of Scotland Rotation

West of Scotland Orthopaedic Journal Club

Visiting Guest: Mr William Leech, Consultant Orthopaedic Surgeon

### **What is the role for lateral retinacular release?**

Clifton R, Ng CY, Nutton RW

J Bone Joint Surg [Br] 2010; 92-B:1-6

Reviewer: Mr Colin Drury StR4 West of Scotland Rotation

### **Background and summary**

Lateral retinacular release involves surgical division of the lateral parapatellar retinaculum of the knee, either as an open or arthroscopic procedure. It is often carried out to address imbalances in the knee extensor mechanism which may be the underlying cause of many patellofemoral disorders. The evidence base regarding indications for lateral release and its clinical effectiveness can be difficult to interpret. The authors aimed to review the available literature in order to provide appropriate guidelines on the use of this technique.

Biomechanical cadaveric studies have not shown increased stability or improvement of patellar tracking with lateral release. Success rates for treatment of anterior knee pain range from 14-100%. Prognosis is worse in those with Grade III/IV degenerative change and in women. Patients with preoperative evidence on CT of lateral patellar tilt or retinacular tightness, have a better outcome.

As a single procedure for treatment of patellar instability, the reported patient satisfaction ranges from 30-100%. This satisfaction has been shown to decrease with time, and poorer results are noted with associated degenerative change and generalised ligamentous laxity. Lateral release alone can lead to symptomatic recurrence in 35% of patients. Attention must be paid to the presence of other factors leading to instability such as trochlear dysplasia, increased tibial tuberosity trochlear groove distance and absent or weak medial patellofemoral ligament.

Lateral release has not been shown to be effective in the treatment of patellofemoral osteoarthritis or improve clinical outcome when performed during total knee replacement. Lateral release can result in haemarthrosis in 1-42% of patients and is also associated with reflex sympathetic dystrophy and overcorrection with medial subluxation of the patella.

### **Conclusions**

The authors conclude that the evidence base does not provide clearly defined indications for lateral release. They suggest its use may be suitable in patients with anterior knee pain with evidence of lateral retinacular tightness. It may only be useful in the minority of cases of patellar

instability if no other contributing factors. The authors conclude its use is not supported in the treatment of patellofemoral osteoarthritis or to improve patellar tracking in total knee replacement surgery.

### Study critique

#### **Strengths:**

- Analyses the evidence regarding individual patellofemoral problems
- Highlights the lack of evidence available

#### **Weaknesses:**

- No explanation of how literature search carried out
- No mention if any papers were excluded
- No indication of study design/ level of evidence in relation to results
- No critique of individual study methods
- Makes a clinical recommendation based on poor evidence

### Endoscopic reconstruction for isolated anterior cruciate ligament rupture

Webb JM, Corry IS, Clingeffer AJ, Pinczewski LA

J Bone Joint Surg [Br]1998;80-B:288-94

Reviewer: Mr J Fraser-Moodie StR6 West of Scotland Rotation

**Background to study:** Anterior cruciate ligament (ACL) injuries typically occur during sport in a young population. There is often concomitant pathology in the knee such as a meniscal or chondral surface injury. Previous studies evaluating the outcome of ACL repair had consisted of heterogeneous populations with varying rates of these additional pathologies, which are known to adversely affect results. The authors elected to investigate outcomes following ligament reconstruction in knees with an isolated ACL injury.

**Study design:** Prospective case series with follow-up to 2 years

**Inclusion criteria:** Consecutive patients undergoing ACL reconstruction in a tertiary referral centre over 16 month period.

**Exclusion criteria:** Any additional articular pathology; additional ligament injury requiring surgery, chondral injury, previous meniscectomy or excision of more than 1/3 of meniscus at time of surgery, abnormal radiograph, abnormal contralateral knee, compensation claimants, refusal to participate in research

**Number of patients:** 90 patients enrolled, 243 exclusions. 3 patients underwent surgery < 3 weeks post-injury, 64 between 3 to 12 weeks and 23 after more than 12 weeks. Mean age of patient 25 years (13 to 42):

**Follow-up:** Pre-operative assessment, then at 12 and 24 months, single examiner. 8 lost to follow-up, 6 after 6 months and 2 after 1 year.

**Endpoints:** International knee documentation committee evaluation. Stability on Lachman test, anterior-drawer, pivot-shift test and instrumented displacement. Thigh atrophy, pain on kneeling, level of sporting activity, Lysholm knee score and radiographic evaluation of tunnel placement.

**Results:** 2 graft ruptures during sport, one graft rupture without history of trauma. 2 further patients excluded as sustained contralateral knee injury. Post-operative tests demonstrated laxity of < 5mm in all patients clinically. 3 patients displaced > 5mm on instrumented testing. 84% returned to moderate or strenuous activity by 2 years. 34 patients reduced their activity level.

**Additional complications:** 2 superficial wound infections, 3 further arthroscopies for limited movement, 1 patellar tendonitis, 1 patellar tendon cyst.

**Conclusions:** ACL reconstruction achieved good knee stability in all but 3 patients where grafts failed. There was a high rate of return to sport.

### Study critique

#### Strengths:

- Large series
- Addresses stated intention, in terms of describing outcomes in ACL reconstruction in young active group with “minimal” additional intra-articular pathology, using strict criteria

#### Weaknesses:

- No control group – level 4 evidence
- Better evidence base would be established if randomised study and repeated in other centres / more than one surgeon
- Senior author noted to be in private practice with no independent follow-up assessments
- 2 years is relatively short period of follow-up assuming 9 months until return to contact sport post-operatively
- Noted that a high proportion had meniscal pathology

**Will study change clinical practice:** This study provided a benchmark with regards outcomes of ACL reconstruction. Authors suggest results support the role of surgery.

### Autologous Chondrocyte Implantation: A Systematic Review

Joshua D. Harris, Robert A. Siston, Xueliang Pan and David C. Flanigan  
J Bone Joint Surg [Am] 2010;92-A:2220-33.

Reviewer: Mr Mark Frame STr5 West of Scotland Rotation

**Background and Summary:** Chondral damage and repair is poorly understood and results in significant patient morbidity. There are many surgical techniques to help address this problem with many showing encouraging early results.

**Aims:**

- Does the literature support the use of autologous chondrocyte implantation over other cartilage procedures?
- Does the literature support one generation of autologous implantation over another?
- Were there any patient or disease specific factors that predict a better outcome with autologous implantation compared to other cartilage procedures?

**Study design:** This paper was a systematic review of the current literature on autologous chondrocyte implantation with 13 studies identified within their inclusion criteria.

**Method:** 4 Independent reviewers carried out searches using MEDLINE, EMBASE, CINAHL, PubMed, SPORT-Discus and Cochrane Collaboration systematic review. Searches on level I and II evidence only.

**Inclusion Criteria:**

1. Comparison of any generation of autologous chondrocyte implantation with any cartilage repair or restoration technique, with reporting of validated clinical outcome measures.
2. Comparison of any generation of autologous chondrocyte implantation with a different generation of autologous chondrocyte implantation, with reporting of validated clinical outcome measures.
3. Evaluation of both arthroscopic and open arthrotomy autologous chondrocyte implantation.
4. Evaluation of Outerbridge/ICRS (International Cartilage Repair Society) Grade-III or IV focal cartilage defects.
5. Level-I and II evidence (randomized controlled trials with >80% follow-up; randomized controlled trials with <80% follow-up, prospective cohort studies).
6. A minimum duration of follow-up of twelve months.
7. Use of the English language or any language for which successful medical translation was achievable.
8. Evaluation of human subjects.
9. Performance of the study from January 1, 1950 through February 25, 2010.
10. Evaluation of the knee joint only (including medial and lateral femoral condyles, trochlea, patella, and medial and lateral tibial plateaus).

**Exclusion Criteria:**

1. Case-control studies, all retrospective studies, case series, expert opinion (Level-V evidence), commentary, surgical techniques, letters to the editor, basic science, or animal studies,
2. Studies utilizing surgical techniques that were not considered standard practice at the time of the writing of the present manuscript,
3. Studies that did not use any validated clinical outcome measures,
4. A duration of follow-up of less than twelve months,
5. Use of a language for which successful medical translation was impossible,
6. Evaluation of any joint other than the knee (including talus, humeral head, femoral head, and acetabulum), and
7. Diffuse osteoarthritis (as defined by a radiographic atlas of osteoarthritis Grade 2 or Kellgren and Lawrence Grade 2).

**Patients:**

- Mean age range 28.7-34.2 years
- Symptom mean time 21-103 months
- Surgical procedures range 0-13
- Osteochondral defect size range 1.9-6.2cm<sup>2</sup>
- All Full thickness
- Located mostly on medial femoral condyle (38-89%)
- Minimum follow up 12-60 months

**Results:** 13 studies identified from 425 with a total of 917 patients in these studies with 1 of 3 surgical procedures identified;

- (1) Autologous chondrocyte implantation
- (2) Microfracture
- (3) Osteochondral autograft

**Study critique****Strengths:**

- Independent reviewers
- Duplication of work to prevent missing papers
- Level I & II evidence only
- Extensive inclusion/exclusion criteria
- Conflict of interest noted
- Rating the quality of papers and their methodology.
- Robust statistical analysis

**Weaknesses:**

- Small number of studies identified
- Difficult to draw conclusions from some comparisons of technique.
- Too many questions to answer.
- Mentioned financial conflict of interest but continued to draw conclusions from those studies.
- Difficult to validate the measurement of the outcomes. Are these consistent throughout the studies?

**Will study change clinical practice:**

- All studies showed improved clinical outcomes after all cartilage techniques.
- Autologous chondrocyte implantation showed better short & intermediate term clinical results compared to microfracture, with 3 out of 7 showing statistically significant better clinical result.
- 2 out of 7 microfracture studies better SF-36 at 2 years but not at 5 years.
- Autologous chondrocyte implantation was equivalent to osteochondral autograft, however there was a slower treatment response with autologous chondrocyte implantation.
- There was no difference between different generations of autologous chondrocyte implantation.

- Arthroscopic autologous chondrocyte implantation showed more rapid improvement with fewer complications and a lower rate of re-operation when compared to open.
- Patient return to sport rates significantly improved with microfracture and second generation autologous chondrocyte implantation at 2 years. Microfracture group declined at 5 years where the autologous chondrocyte implantation group stabilized.
- Age was shown to be a significant predictor of outcome with age <30 equaling a better Lysholm and SF-36 at 2 and 5 years.
- With all techniques symptom time prior to surgery was also an important predictor; the shorter the symptom duration, the better the outcome. Size of lesion was also a predictor with microfracture having a better early outcome with lesions <4cm<sup>2</sup> and autologous chondrocyte implantation with a more favorable outcome with lesions >4cm<sup>2</sup>.

### **Ligamentous Restraints to Anterior-Posterior Drawer in the Human Knee**

ButlerDL, Noyes FR, ES Grood

J Bone Joint Surg [Am] 1980;62-A:259-70.

Reviewer: Mr David Russell StR4 West of Scotland Rotation

**Aim & Study Type:** This is an anatomical study aimed at determining the primary restraining force of each of the major ligamentous structures in the knee to anterior and posterior drawer.

**Materials and Methods:** 14 knee specimens from cadavers aged 16 to 65. The dissected knees were mounted in flexion with the tibia secured to a moving actuator and the femur to a load cell. Eleven knees were mounted 90 degrees of flexion and 3 knees were mounted at 30 degrees of flexion. All knees were tested in anterior drawer and eleven were tested in posterior drawer. The rate of anterior and posterior displacement was varied in 8 knees. To determine the contribution of each of the major ligamentous structures, displacement of the tibia relative to the femur of 5mm was performed followed by a measurement of resistance. A ligament was then cut and the measurements repeated. Following resection of the primary restraints (cruciate ligaments), larger displacements were applied in testing of the secondary restraints e.g. collateral ligaments. The menisci were not included in the analysis.

**Results:** Anterior cruciate ligament (ACL) with displacement of 5mm, average restraining force of 440N at 90 degrees, 330N at 30 degrees (N.B. clinical assessment force of anterior drawer approx 45-90N). The ACL provided 85.1 percent of anterior drawer restraint; iliotibial band and medial capsule were the main secondary restraints. Posterior cruciate ligament (PCL) measured 421N at 90 degrees and 330N at 30 degrees. This provided 96 percent of the restraining force in posterior drawer. The posterolateral capsule and popliteus were the main secondary restraints.

**Conclusion:** This paper introduced concept of primary and secondary restraints to posterior and anterior drawer in the anterior and posterior cruciate ligaments. Secondary restraints include other major ligamentous structures around the knee.

## **Study critique**

### ***Strengths:***

- New method reducing the effect of cutting order of ligamentous structures compared to previous studies
- ACL and PCL demonstrated as primary restraints in that they contributed to the majority of restraint to anterior and posterior drawer
- Study highlights possible reasons for false negative anterior drawer due to insufficient force being applied in clinical testing. Also highlights potential reason for false positive anterior drawer in the presence of PCL injury.

### ***Weaknesses:***

- Anatomical cadaver based study
- Small numbers
- Methodology strays and introduces new variables throughout the study despite small sample size for example angle of flexion, rate of displacement. Despite this the results are consistent and significant between specimens.

**Will study change clinical practice:** This study scientifically quantifies and determines the primary restraining structures in the displacement of the tibia relative to the femur. It also highlights the restraining ability of the secondary restraints which may mask physiological instability on clinical examination.