

The Knee Webinar – Andrew Unwin, 16th July 2014

Summary Notes

Andrew Unwin is an orthopaedic consultant at the Windsor Knee Clinic, specializing in ACL repair and Osteotomy. He is also Professor of Anatomy at Imperial College London.

ACL Injury Management

Recognition:

- History: twisting, weight-bearing injury
- Non-contact (eg soccer, not in tackle. Note: women more likely to sustain ACL injuries in soccer)
- Sudden "pop" ("two fist sign")
- Early swelling (within an hour, due to blood from ligament or fracture). Next day swelling likely to be effusion more likely to be meniscal.
- Can be difficult to examine so history vital
- Any suspicion of ACL, should be x-rayed within first few days to exclude fracture
- Immediate Post-Injury
 - Hands-on prehab is very important if surgery is indicated
 - Early use of ice, elevation etc.
 - Assess whether safe to weight bear only contraindication is significant MCL injury (obvious on clinical examination)
 - **No brace** (for any knee injury) unless other ligament laxity or for transport issues. Braces lead to muscle wasting. Tubigrip if patient insists (may affect quads)
 - Early WB and return to normal gait pattern reassurance! Crutches only for first day or so. Hydrotherapy very good for restoring gait pattern.
 - Establish accurate diagnosis with examination, x-ray and MRI scan (MRI not necessary in early stages)
 - Don't delay rehabilitation for MRI scan
 - **Early** referral for physical therapy
 - **Hyperextension** and full flexion as soon as possible. Hyperextension at time of surgery is what will remain afterwards. Should equal the other knee (if normal). Most patients with ACL well-motivated, as likely to be sportsman.

<u>Surgery</u>

General principles:

- Forces involved:
 - = Normal tensile strength of health ACL is 2000N
 - = Stair climbing imposes 300 400N stress

- = Walking: ~ 150N
- = Gentle twist: ~400N
- = Graft strength is ~4000N, but reduces initially while settling. Screws only have strength of 800N. At 6 weeks, graft starting to bond to bone.

- 75% can cope well without an ACL. Unless knee giving way regularly, no benefit in ACL reconstruction. Knee giving way will lead to meniscal injury and OA.

- Under 25 years old, surgery probably indicated
- Over 25, only if knee unstable in pivoting sport
- Note 1: Isolated PCL injury not usually repaired. But if injured in conjunction with postero-lateral corner, knee becomes grossly unstable and repair needed.
- Note 2: No evidence that ACL reconstruction decreases risk of later OA
- Outcomes:

= age related (diagnosis of tissue causing symptoms may be difficult in a degenerative joint)

- = Surgery can cause clots
- = Removal of healthy cartilage will make the patient worse
- = Much is dependent on rehab compliance
- Future:
 - = Osteotomy likely to stay
 - = Biological joint resurfacing may replace knee replacement in 25 years
 - = Minimally invasive surgery improving
 - = Imaging is improving rapidly

 $\begin{array}{l} \blacktriangleright \qquad \underline{Prehab}. \ \ Allow 6-8 \ weeks \ post-injury \ to \ prehab \ knee, \ before \ surgery. \ Timing \ is \ not \ rigid - based \ on \ readiness \ of \ knee. \ Can \ be \ done \ within \ first \ 24 \ hrs \ (haemarthrosis \ has \ not \ yet \ caused \ damage), \ but \ this \ is \ rare \ in \ UK \end{array}$

Symmetry. Important – patients demand it (symmetrical RoM, pain etc.)

Surgery Windows. Worst time to operate is 1-3 weeks. Blood has caused scarring, surgery can result in arthrofibrosis, which is worse than an unstable knee. Knee must be normal at time of surgery (apart from pivoting).

Purpose of Surgery: Not pain relief – this will go anyway. Aim is stability.

Contraindications:

- Patient looking for pain relief only - no need for stability (not involved in twisting, pivoting activities).

- Patient unlikely to comply with rehab (stiff, painful knee far worse than unstable knee)

<u>Prehabilitation</u>

- The knee should be normal at the time of reconstruction other than potential instability on pivoting

- Full hyperextension
- Full flexion
- Normal gait pattern
- Minimal effusion

- Good proprioceptive control of the knee with extensor mechanism rehabilitation
- Early core stability exercises
- Good level of general fitness
- Education, realistic expectations, reconstruction still indicated osteopaths important in advising otherwise
- Information documents

Surgical aspects:

- Normally day surgery or overnight stay
- Arthroscopic approach minor trauma to patient
- Patellar tendon graft (30-40% in UK): painful, causes difficulty in kneeling
- Hamstring graft (60-70%): more common, straightforward rehab (no worse than muscle strain), twice as strong as ACL except in early stages, when still reliant on screws for integrity
- Ipsilateral graft recreational athletes
- Contralateral graft professional athletes. Graft is what causes most of the problem, hence use good leg.
- Allograft (ie from a donor): uncommon

<u>Rehab</u>

Phase 1 Rehab – No Torsional Activity

- Phase 1a: Post surgery

- = Patient education is important, Including during prehab
- = Adequate analgesia (IV NSAID). Generally patients not in pain post-surgery and opiates not required.
- = Elevation: 2-3 weeks post surgery
- = Cryocuff / "Patient Ready": very useful in reducing swelling
- = No splints, braces or crutches (unless gait abnormal)
- = Early removal of dressings
- = Hyperextension within 2-4 hours of surgery
- = Flexion beyond 90 degrees within 24 hours
- = Crutches only for balance freely bear weight
- = Home on day of surgery or next day
- = Warn about bruising after hamstring graft, usually after about one week.!

- Phase 1b: First 2 weeks at Home

- = Physical therapy/rehab within 3 days
- = Helpful if practitioner is one they've seen for prehab
- = Rest and elevation regime, but with constant movement
- = Maintain hyperextension, especially days 3-7 when swelling develops
- = Regular ice / cryocuff etc.
- = Adequate analgesia (elevation, ice, NSAIDS, paracetamol). Avoid opiates.
- = Start out patient rehab at 3 days, twice per week for 3 weeks, then weekly

= Adequate hygiene in clinic for first 2 weeks: patients have active wounds. Premises need to be clean and seen to be clean. Use gloves

= Active and passive movements – regain control of the knee

- = Patellar mobilisation and control
- = Management of donor site morbidity: patellar tendon site needs particular attention
- = Minimal walking but normal gait pattern when doing so
- = Avoid torsional forces on leg
- = No travel to work for 3 weeks (work from home instead)

- Phase 1c: Weeks 2-6 (Getting Back to Normal)

- = Week 2-3 transition from complete rest to normal daily activity (walk, drive (note insurance concerns), use a train)
- = Return to sedentary employment
- = Continue normal gait pattern
- = Encourage hydrotherapy
- = Maintain hyperextension and achieve full flexion. Less than full ROM after 4 weeks indicates a problem.
- = Reduction of effusion. Swellling can last a few weeks.
- = Core stability without torsional forces
- = Careful rehab of other areas of the knee (e.g. following patellar tendon graft, avoid deep squats, lunges etc)

= Regular communication between patient, surgeon and therapist: surgeon will welcome information about rehab problems

= Rarely there may be need for MUA (manipulation under anaesthetic) or arthroscopy for arthrofibrosis in cases of non-progression

Phase 2: Proprioceptive Phase (week 6 – end of month 4)

- Most important phase for return to sport – significantly reduces the re-rupture rate in BOTH legs

- No running
- Continue with phase 1
- Proprioceptive exercises
- Wobble board/trampet/skipping/hopping/jumping
- Wii-Fit!
- Encourage realistic and life-like expectations
- Explain importance of this phase: by 4 months should be able to stand on injured leg, twist and turn with eyes closed as well as unaffected side

Phase 3: Running (months 4 - 6)

- Fast walking on treadmill
- Normal gait pattern has to be achieved before road running
- Run on treadmill
- Run on grass
- Run on hard ground
- Shuttle runs
- Side-steps etc.
- Modify according to patient requirements (may be activity/sport-specific)

Phase 4: Sports Specific Training (6 months on) \geq

- Preferred sports
- "Training-sports"
- Gradual progression must be controlled environment
- Orthopaedic check at 9 months for satisfactory graft

\succ Return to Sports

- = 9 months-2 years
- = Encouragement that ability will improve, especially proprioception
- = General fitness
- = Warm-up/warm-down etc.
- = Realistic expectations
- = Reminder of what an ACL reconstruction is for stability. There will be pain and swelling at times.
- = Returning too early likely to lead to re-rupture and meniscal damage. Revision is difficult.
- = Most common problem: anterior knee pain due to running before core stability adequate

Final Thoughts

- \succ Referral does not mean referral for surgery
- \geq Happy to provide reassurance, an additional opinion
- \triangleright MRI scan is not a diagnosis: has to be put in context (anyone over 50 is likely to have a meniscal tear)
- \succ 90% of diagnosis of a knee problem is in the history. Examination is confirmatory. MRI and Xray are minor components.
- Orthopaedic testing: use Lachman's test, not the Anterior Drawer Test
- \geq Orthotic therapy: not useful to treat injury, but very good to address malalignment
- \triangleright Older ACL patients likely to rehab more quickly, due to lesser demands on the joint

Osteotomy

- "Cutting Bone" \geq
- Back in fashion over the last 15 years (but not done in USA)
- AAAA Indicated by pain/deformity/instability, due to overload of medial compartment
- Can be used to realign knee prior to ligament reconstruction
- Osteotomy unloads the compartment, but leaves joint surface untouched
- \succ Now a very subtle operation – 2cm incision
- Pt on crutches for just 2 weeks

Orthopaedic Statistics

- ACL surgery takes ~40 mins \geq
- \succ TKR takes ~75 mins

Published statistics useful to find surgeons experienced in the specific operation in question (need to be doing at least one a week). Mortality not a meaningful statistic in orthopaedics. Similarly, need to pick a rehab specialist who is doing it regularly.

Cerebral Palsy Issues

Diplegic pt with specialist interest in sport – will be very dependent on ACL. Non-sporty, can cope without.

Rehab has to be patient-specific.