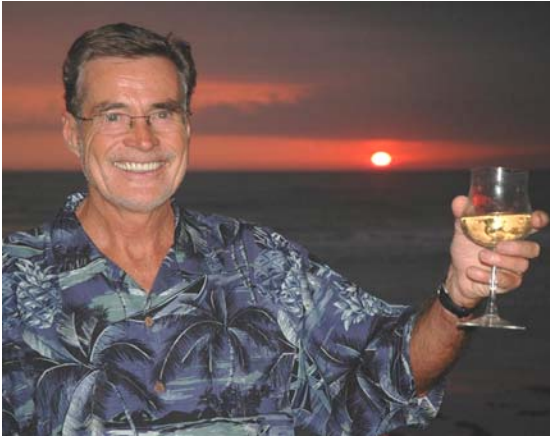


## Practical Arthroscopy Newsletter No 1 2006

### Editorial



Remember to smell the roses, and watch the sunsets, as there are not many left. I think that I can make the prediction that we will still be doing the same type of ACL reconstruction for the next few years. I was hoping to see the development of a synthetic collagen scaffold which would be implanted into the existing ACL tissue, thus avoiding the harvest of autogenous grafts. On the other hand we could avoid the harvest site problems by just using allografts for all reconstructions.

### **Advanced Arthroscopy Course – Courmayeur Italy 15-20 Jan, 2006**



Fig 1 Courmayeur in the Italian Alps

The advanced arthroscopy course is run each year by Ejnar Eriksson in the mountain valley town of Courmayeur, nestled right up against the mountain, on the Italian side of Mont Blanc. The sunrise and sunset are fantastic on the mountain.



Fig 2 A full moon over the ski area of Courmayeur.

The meeting was held in the Pavilion hotel. There were about 100 registrants from many countries, but mostly Italian. This is the first time in a long while that I have sat in the back of the audience and taken notes, just like the old days. I find that I can still learn something from most of these speakers.

Grazie, thank you in Italian, to Eriksson, who speaks 7 languages and runs a great meeting. The discussion in the evening was very good with Eriksson asking the panel very pointed questions about their current treatment plans for controversial topics, such as ACL reconstruction for the immature athlete with an ACL injury.

It snowed all night Monday and all day Tues. The Tues morning session went well, and then I went up skiing with Eriksson and Magnasson. We skied down to a restaurant, Vielle, and had a long Italian lunch and lot of vina rosa. The ski down was very careful, but in spite of that, I did manage a fall due to the flat light, but probably due to too much vino. Ejnar, at age 77, still managed to ski better than me, even after the wine. Now that skill at his age is something to look forward to!



Fig 3. Ejnar at the Veille restaurant up on the mountain.

### **Basics of Arthroscopy – Ejnar Eriksson – Stockholm Sweden**

Eriksson recommends the use of the dual pump that both evacuates the joint, and inflows fluid. Both Stryker and AMS make these. He also suggested that we shouldn't forget about the use of the 70° scope. It is useful for both the knee and shoulder. In the knee, use the 70° to visualize the tear of the posterior horn of the meniscus in the posterior compartment. It is also helpful with the PCL reconstruction to visualize the tibial attachment of the PCL.

### **Patellar Tendon Reconstruction – Mark Purnell, Aspen CO.**

Purnell says that Clancy claims that you can't do an endoscopic ACL anatomically; you must use the 2 incision technique. Further, Freddie Fu says that you must do a double bundle reconstruction to be anatomic. Purnell reviewed the attachment sites on the femur and the tibia, and then did 3-D reconstruction of the anatomy of the cruciate on cadaver model. He correlated the footprint on the CT reconstruction with what you see on the arthroscopic view. With this information he feels that you can do a transtibial endoscopic reconstruction. The CT reconstruction can also be done for the PCL.

The sagittal plane should be 45-50° for the tibial tunnel.

Purnell uses an Endobutton for femoral fixation with number 5 Ethibond suture to attach the bone plug. He harvests the graft with 2 small vertical incisions over the patella and tibial tubercle. He uses a Smillie knife to cut the tendon. Purnell puts the arthroscope through the middle of the harvest defect. He leaves a stump distally to prevent water from draining out of the joint.

The coronal plane for tibial tunnel should be 55-66°. He pulls the graft through with the Endobutton on the proximal end. There is a larger Endobutton tray, the "maxi", to deal with the complication of over drilling the lateral femoral cortex.

This makes the Endobutton 20 mm.

Another solution for this is to drill a plastic button (Ethicon) with the Endobutton drill bit. Cut down on the Endobutton, and pull it through the 4.2 hole in the 14 mm button and Voila, you have secured the Endobutton on the cortex of the femur.

### **Hamstring grafts – Bjorn Engstrom – Stockholm Sweden**

Engstrom uses the semi-t only. He makes the incision vertical, and then incises the fascia above the tendon, and picks up the semitendinosus tendon. He places a mersilene tape around the tendons during the harvest. One should be careful with cutting the attachments to the gastrocnemius. The nurse prepares the graft with whip stitches, and measures the size. When using only the semi-t it may be quadrupled to 8-9 mm in size.

He uses the endoscopic technique to drill the femur. He uses an Endobutton for the femoral side with 25 mm of graft in the femoral tunnel. He uses a screw post

to fix the graft on the tibial side. He has also developed a top hat device to tie the sutures over. (called a cobra) I think that I recall a similar device developed years ago, but not marketed!

### **ACL reconstruction – Guiliano Cerulli's technique – Perugia Italy**

He uses hamstrings, and a half tunnel inside out technique. This is similar to the technique described by Oshkoski. He uses a LARS type metal screw from inside out. In 5 years he has done 622 ACL cases using this technique.

Cerulli and Mario Lamontagne did a study with in vivo strain gauge measurements on the ACL. They found that during rapid deceleration, the quads were found to contract before the ground contact occurred. This was a study that confirmed the quads active mechanism that is seen in skiers who tear the ACL during a compression landing with no torsion on the knee.

### **Immature Athletes who were copers – Steiner Johansen – Oslo Norway**

This was a report on children who had an ACL injury and were copers. There was better muscle strength testing, and less laxity in the copers.

The definition of immature was a child at age 14. The definition of a coper was one who could do 80% of the jump tests, and had an IKDC score about 80%.

40% of the study included reconstructed patients.

60% of the children were copers in the study.

The non-copers scored low on the VAS score, and they subjectively did not feel stable. This makes one think that a period of conservative treatment is worthwhile to determine who is going to be a coper.

### **Double versus Single Bundle ACL Reconstruction – Mitsui Ochi – Hiroshima Japan.**

Ochi feels that it is important to try to preserve the remnant of the ACL. In his study he noted the ACL scarred to the PCL in 38%, to the roof in 8%, and to the lateral wall in 12% , but most, 42%, were reabsorbed. These latter cases need to have a standard reconstruction. The main reason to preserve the ACL is that there are mechanoreceptors in the remnant, and they are thought to help with proprioception.

He advocates a 2 incision technique with preservation of the remnant and augmentation with semitendonosus. This has evolved to a double bundle to leave the existing bundle, and to add the missing bundle. This is really an isolated AM or PL bundle reconstruction. He uses a double bundle semi-t with endobutton fixation on the femur. The histology of the remnant showed mechanoreceptors, and this correlated with improved proprioception of the joint.

This is not a common procedure as in his series over 5 years only 42 patients had this type of augmentation. This is a difficult procedure with no definite indications. But, think of this when there is a significant thick ACL remnant.

NB. In a study that Ochi published in JBJS in 2004, he found that there was no difference in the single and double bundle reconstructions. This was a randomized clinical trial, but the tibial side was done with a single tunnel.

### **ACL injuries and Cartilage Lesions – Matteo Denti - Monza Italy**

In 100 ACL's that he reviewed there were 21 cartilage lesions. The initial treatment was a microfracture. The flaps and fibrillations were debrided with shaver. The crater less than 2.5 cm was treated with mosaicoplasty. When the lesion was larger than 2.5 cm, he used an open chondrocyte implantation procedure, as a second stage after the ACL rehab was completed. He did a comparison study of grade 3 lesions that were treated with microfracture versus no treatment. The microfracture did not do as well, and had more pain. Explanation??

The Oslo group compared chondrocyte implantation with microfracture, and there were no significant differences between the groups, at both 2 and 5 years. The conclusion is that microfracture is cheaper, and easier to perform with no real difference in the short term outcomes.

The ACL study group would perform a microfracture first before other procedures. Denti feels that to stabilize the ACL is the most important focus, with the microfracture procedure being a benign, but effective procedure.

### **ACL reconstruction: Does it restore rotational stability? – Tassos Georgoullis – Ioannina, Greece.**

He tested 20 ACL BTB reconstructions for internal and external tibial rotation during a pivot activity. There was more rotation in the reconstructed knee compared to the normal knee. In comparison with the BTB and hamstrings, the hamstrings were a little better, but not normal. The residual rotation may lead to the development of OA in the long term. The lack of rotation control makes one consider the double bundle reconstruction.

### **Double bundle reconstruction by Tassos Georgoullis.**

When doing a single bundle reconstruction, he uses a mechanical leg holder to flex the knee to 120° to drill the femoral tunnel through the anteromedial portal. 50% of his ACL reconstructions are with BTB. Only some patients have double bundle reconstructions with hamstrings. These are older patients, who will follow instructions. At the present time he feels that this is not a real improvement over the single bundle, but is simply a new procedure. Are we really just bored doing the same old single bundle reconstruction?

We still do not know the knee flexion angle or the correct amount of tension to apply to the grafts before they are fixed. Are these 2 tunnels going to give us a problem with revisions?

Tassos uses the anteromedial approach with 120° knee flexion to drill the femoral tunnels. He marks the 2 positions of the femoral tunnels with cautery, with the knee flexed at 90°. He then drills 2 guide wires through the anteromedial portal. The 2 tibial tunnels are drilled with a guide. The AM must be moved more anteromedially on the tibia to have 2 separate tunnels. The PL is drilled first. This may be a good use for the suture separator. Femoral fixation is with the endobutton. He stressed that you must avoid impingement in extension.

Tassos has done only 20 patients so far. He has an instinctive feeling that the results are better.

### **PCL injuries - Eriksson**

The take home message is that maybe all PCL's don't need surgery. He feels that the acute injury may benefit by the Jack brace developed by Roli Jacob. This spring loaded brace pushes the tibia forward to contract the force of gravity. It helps the PCL to heal in the optimum shortened position. Eriksson reported poor operative results in 1986. Dejour reported poor long term, 30 year, outcomes in the conservative treated patients.

### **PCL Reconstruction – Claudio Zorzi - Verona Italy**

Indications for surgical reconstruction are the combined ligament injuries, and very symptomatic chronic injuries. Why are the results of surgery not predictable? It is because we are unable to restore the normal kinematics of the knee. Yagi showed that the normal kinematics is only restored with double bundle reconstruction. This group uses the Achilles tendon or tibialis allograft. When doing the double bundle with the Achilles allograft, they leave the bone plug in the proximal end of the tibial tunnel.

Eriksson reminded me that Jacob and Gescheter in Europe were the first proponents of the inlay graft.

### **Posterolateral corner reconstruction – Claudio Zorzi Verona**

This is the dark side of the knee and at the present time requires open reconstruction. The diagnosis is made by the dial test. It is positive if more than 5-10° greater than the opposite side. External rotation recurvatum test is indicative of injury to both the posterolateral corner and the PCL. The posterolateral drawer test is positive, when performed with the knee flexed to 90°, and the foot at 15° ER. The arthroscopic drive through sign is also positive for posterolateral corner injury.

Surgical technique. They use a hamstring tendon passed through the fibular head, the Larson figure of 8 technique.

The anatomic variation of this reconstruction uses a double femoral tunnel. Find the 2 insertion sites on the femur, the site of the LCL and popliteus. The graft is fixed on the femur first, and the end of the graft tunneled under biceps. The one limb goes to the back of the fibula, and the other through the fibula head. The best results are to repair the torn structures early. Don't delay this repair.

### **Posterolateral corner reconstruction – Bent Wulff-Jakobsen – Aarhus, Denmark.**

The combined lesions of the posterolateral corner are usually with ACL and PCL injuries. LaPrade has made significant contribution to the posterolateral corner knowledge. ACL graft tension also has been shown to increase with external rotation. (same as with the PCL)

The principles of treatment are to restore normal function with early repair. (<2 weeks) The injuries are graded:

Grade A <5°

Grade B 5-10°

Grade C 10-15\*

Grade D >29\*

The simple reconstructions, such as Larson's do not restore the normal kinematics. It was interesting to note that 35% of his revision cases came from combined ACL and posterolateral corner cases.

### **Knee dislocations – Steiner Johansen – Oslo, Norway**

They have a series of 170 knee dislocations at the trauma center in Oslo. They try to do these within the first 2 weeks. In the last year, they treated 24 cases.

Management of the acute injuries: First, evaluate the entire patient, evaluate the neurovascular status, plain x-rays. Sometimes it is necessary to apply an external fixator due to other injuries. They don't do the cruciates initially, but only do the collaterals.

First, evaluate the circulation, with the pulse and ankle brachial index. If this is less than 0.75, it is significant. If it is greater than 0.9, it is normal, and you don't need an arteriogram. One must do serial exams. The pulse less foot needs immediate surgery, don't waste time in getting arteriogram. 8 hours is maximum delay time.

For open injuries, debride, and close the joint. Repair the collaterals immediately, and the cruciates later. Look for a compartment syndrome.

Early surgery - repair/reconstruction in first 2 weeks.

Get the team organized for a daytime procedure, and obtain the allografts.

Use continuous passive motion for 4 hours per day to reduce swelling and improve range of motion. Use a tourniquet and a low pressure pump.

The cruciates are usually reconstructed with a single bundle reconstruction.

Primary repair of collaterals is done with suture anchors.

Augmentation or reconstruction is done when primary tissue repair is not adequate.

Do all the ligaments if possible in early surgery.

For grade 2 PCL injuries; they are treated in a brace, with repair of the collaterals.

Repair the collaterals along with the fracture treatment, and leave the cruciates until later.

No cases are done between 2 weeks and 3 months.

For the chronic cases a history, clinical exam, MRI, long standing x-rays, and stress x-rays are performed. They felt that it was important to correct bony alignment before ligament surgery with open wedge osteotomy. The fixed posterior subluxation must be dealt with first, with the use of a pre-op ROM brace.

The rehab was slow with a brace locked in full extension, and partial weight bearing on crutches. The patient was allowed only passive flexion for 8 weeks. After 8 weeks, they start rehab that lasts for 1 year.

Results: 38 patients have been followed for .2 years. These are older patients, 40 years of age.

50% have acl/pcl/mcl

30% have acl/pcl/plc

Most are arthroscopic cruciate reconstructions with primary collateral repairs. There were several complications of infection and stiffness. The Tegner scale decreases in most cases. The average KT SSD was 4.2 mm.

The Lysholm score was average of 73.

The better results were when the 3 stabilizers were gone, ie acl/pcl/mcl and acl/pcl/plc. The authors felt that this major injury should be treated in a specialized trauma center and should be referred.

The grade 2 MCL should be treated conservatively, and the grade 3 should be treated with operative repair.

### **Articular Cartilage Treatment – Steiner Johansen – Oslo Norway.**

There have been only 4 RCT's on the treatment of cartilage. The Oslo group presented a RCT on microfracture and ACI. (JBJS 2004)

Grade 3 and 4 lesions greater than 2cm are only 6% of all cases of arthroscopy. This report deals with chondral lesions in young patients, not osteoarthritis in older patients.

This study did a metanalysis of the existing RCT studies using the Coleman and JBJS level of evidence.

The hypothesis was that the methodology of existing studies was weak and this would correlate with the quality of the paper. 43 out of 100 were weak, and no improvement over the past few years.

Lysholm and Cincinnati scores were the most common, but not these scales are not validated for cartilage.

The message was that we have no really good studies to quote for our selection of treatment of cartilage lesions.

Summary of the Oslo RCT of microfracture versus chondrocyte implantation.

The outcome was the same, but there was a trend towards better outcome in the microfracture group. The histology was compared at 2 years, and was a trend to better hyaline cartilage in the ACI group. There were more failures, and repeated surgeries in the ACI group.

The 5 year follow-up showed better SF-36 scores in the microfracture patients, but overall the results were the same. The failures occurred earlier in the ACI group.

### **MPFL reconstruction for patellar dislocation – Mitsui Ochi**

For habitual dislocation in young patients with open growth plates, Ochi uses the semitendinosus graft. There is very little length change from epicondyle to proximal 1/3 medial patella. This is the ideal position to place the graft for medial patellofemoral ligament reconstruction. The Kujala score was reported. The authors used a 2 kgm stress lateral skyline view to assess the patella laxity.

### **Local Anaesthesia for knee surgery. Borg Engstrom**

In the Caprio Arthro clinic in Stockholm most of the knee arthroscopy cases are done under local anesthesia, 1,300 cases last year.

Several points that he made are:

15% of the cases need sedation,

don't book meniscal repair that may need sutures, and a secondary incision  
avoid the nervous and anxious patient,  
wait 20-40 mins for the anesthesia to work,  
use 10 cc of Marcaine with epinephrine in each portal, and 20 cc in the joint,  
tourniquet is not necessary,  
use the AMS pump,

### **Meniscus anatomy and biomechanics – Gert Kristensen**

The meniscus bears load and acts as a stabilizer. If both the ACL and the meniscus are removed the anterior translation is increased. The menisci are very mobile structures, and move anterior and posterior with flexion and extension. The medial meniscus moves 5 mm, and the lateral moves 11 mm. The blood supply is 1/3 of the outer section. This led to the classification of red on red, red on white, and white on white. Too many sutures may cut off the blood supply of the meniscus. The meniscus has nerves and mechanoreceptors. The message from this basic science presentation was to save the meniscus.

### **Approaches to Meniscus repair – Borg Engstrom**

A history of meniscal repair and the current methods were reviewed. Chronic tears should be freshened with a rasp and shaver to make it look like an acute tear. Use a vertical suture of ethibond. The meniscus may only partially heal, and may re-tear years later. Engstrom uses a zone specific cannula system to place inside out sutures. You need to make a small external incision to expose the capsule. T-fix and Fast fix were evaluated for safety in a lab study, and were found to be safe. Always have the knee in flexion to avoid the artery and the peroneal nerve.

There is no real concern if the suture goes through the popliteus tendon. Post op he uses crutches and brace. Engstrom advises the patients to avoid squats for 3 months, and allows return to sports in 4-6 months. Barber has fewer failures in the weight bearing group compared to the non-weight bearing group. Total immobilization decreases collagen formation and maturation. Weight bearing tends to expand the meniscus and compresses the meniscal tear. A radial tear is the opposite. Canon had 70% overall healing rate, and better results in the group done concomitantly with an ACL reconstruction. The short tears have better results. (Canon) Pullout strengths were reviewed – Barber. The more peripheral tears had better healing. The lateral meniscus had slightly better healing. Chronic tears were not quite as good.

The indications are young patient with short tear, that is acute, and vertical peripheral, unstable, and not degenerative. Leave stable, and incomplete tears without repair. Don't repair old degenerative horizontal tears or flap tears.

### **Meniscus repair with the arrow. Gert Kristensen**

Indications for meniscal repair have been reported in Arthroscopy vol 19 supplement. Don't forget about the creation of a partial MCL tear in a tight knee by using a no 18 gauge needle to produce some MCL laxity.

## Workshops on Knee and Shoulder Arthroscopic Surgery.



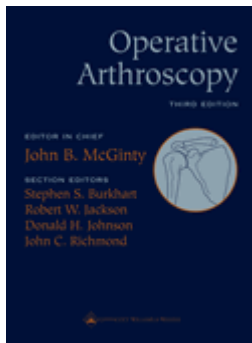
This was a ski meeting, so when the lifts closed, there was a demo of surgical technique. The demo was followed by the participants performing similar procedures on the plastic models.

### **Mark Your Surgical Site.**



Alan Barber sent me this innovation on the mark your surgical site. In addition to marking his initials on the knee, he has the patient pull an anti-embolism stocking on the good leg just prior to going into the OR. This makes sense, as I saw someone pick up the unmarked leg to place the tourniquet on, even though it was not marked. It was uncovered, and the first knee that he saw, so it must need a tourniquet!

**McGinty's Operative Arthroscopy Textbook (now available in Spanish)**



Extensively revised and updated for its Third Edition, **Operative Arthroscopy** remains the most comprehensive and authoritative reference in this rapidly advancing specialty. World-renowned experts describe the latest instrumentation and techniques and detail proven minimally invasive procedures for the knee, shoulder, elbow, wrist, hip, foot, ankle, and spine.

This edition gives experienced and training orthopaedic surgeons the state-of-the-art information they need to stay current and increase the coverage in their practice. New topics include meniscus repair with implantable devices, arthroscopic knot tying, post-traumatic and post-surgical shoulder stiffness, the thrower's shoulder, thermal capsulorrhaphy, fractures about the shoulder, arthroscopic radial head resection, arthroscopic management of the stiff elbow, elbow arthroscopy in the throwing athlete, hip arthroscopy in the athlete, arthroscopic-assisted management of ankle fractures, osteochondral autografts of the talus, and sub-talar arthroscopy.

Hundreds of quality illustrations--including full-color arthroscopic views, surgical exposures, and line drawings--guide surgeons in technique and clinical decision-making. The text offers stepwise intra-operative instruction on commonly performed procedures, including cruciate ligament reconstruction, meniscal repair, stabilization of the shoulder, treatment of rotator cuff tears, and meniscal and chondral allografts.

***This edition includes a free DVD of surgical procedures***, with over 200 minutes of select authors' video to demonstrate key surgical points and techniques.

See full description at:

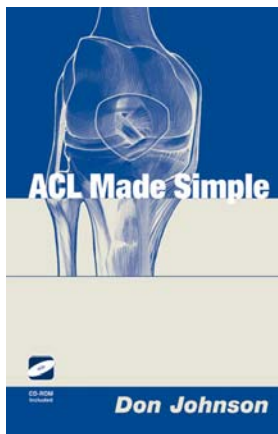
<http://www.lww.com/product/?0-7817-3265-4>

### **ACL Made Simple**

All you wanted to know about the ACL is now available in this book and CD from Springer. See the web site at:

[http://www.springer-](http://www.springer-ny.com/detail.tpl?cart=10722687896533522&isbn=0387401466)

[ny.com/detail.tpl?cart=10722687896533522&isbn=0387401466](http://www.springer-ny.com/detail.tpl?cart=10722687896533522&isbn=0387401466)



ACL Made Simple is a book/CD-ROM combination that educates orthopedic residents, athletic trainers, and various medical support staff about the fundamentals of ACL injuries. The content is both thorough and practical. Readers benefit from comprehensive discussions of diagnosis, partial tears, treatment options, operative techniques, and complications. This definitive guide also outlines a six-month rehabilitation program complete with goals, stages, and exercises. More than 150 photographs and diagrams illuminate key concepts. The CD-ROM is keyed to each chapter and compliments the text, making it easy for users to locate sections of particular interest. The numerous graphics and narrated video clips are dynamic tools that highlight topics including the mechanism of injury, physical examination, and surgical techniques.

### **Table of Contents**

Contents: Introduction, Diagnosis, Partial Tears of the ACL, Treatment Options, Graft Selection, Hamstring Graft Reconstruction Techniques, Patellar Tendon Graft Technique, Rehabilitation, Complications, Results, references

### **Upcoming Meetings**

- **AAOS Annual Meeting – 22-26 March, 2006 Chicago**  
Contact [www.aaos.org](http://www.aaos.org)
- **Residents and Fellows Arthroscopy Conference 5-6 May 2006**
  - Palm Island Florida
  - Contact [ksousa@linvatec.com](mailto:ksousa@linvatec.com)
- **AANA Spring Annual Meeting** Hollywood Florida May 17-21, 2006  
contact [www.aana.org](http://www.aana.org)
- **Esch Shoulder Meeting San Diego CA** June 21-24, 2006
  - Contact [www.shoulder.com](http://www.shoulder.com)