

**Practical Arthroscopy Newsletter No 3, 2006**  
**Editorial**



I have just returned from a quick trip to Japan. I love all the technology that they take for granted, like the bullet train that goes 200 km/hour through the suburbs of Osaka. I realize how behind we are here with our 'O' train that goes through the university at 20 km/hour! I had a great photo shoot and have posted some of the pictures Kyoto on the web site [www.flickr.com/photos/donjohnson](http://www.flickr.com/photos/donjohnson) Kyoto is a city that has 2,000 temples and shrines. I certainly did not do it justice in the 36 hours that I spent there, and I intend in going back to learn more about this unique city.

**Peroneal tendon allografts**



Fig 1. The four strand peroneal tendon allograft.

The peroneal tendon allograft has been a great graft for revision cases. Each peroneal tendon has been 6x24 mm, and that makes a 10mm four bundle graft. This size graft would be ideal for tunnel enlargement in revision cases. Fig 2. This is larger than the tibialis allograft, and the technique of using the tensioner with the screw placed up the middle of the tendons can be utilized. (Placing the screw up the middle of the tendon improves the pullout strength. Hayes et al. Arthroscopy Vol 21 No 6 June 2005) I think that they would also make great double bundle grafts. In some small patients a single graft doubled over could be used, as this makes an 8 mm double graft.



Fig 2. Tunnel enlargement after hamstring graft reconstruction.

### **Autologous Chondrocyte Implantation**

The debate continues. The Norwegian study published in JBJS in 2004 showed that at 2 years there was no significant difference between ACI and microfracture. This study included arthroscopy and biopsy of the regenerated tissue at the 2 year follow-up. I recently heard the 5 year up-date, and there is still no difference in outcome at this later review.

The current concepts review published in Osteoarthritis and Cartilage did a meta-analysis of the 3 clinical trials comparing ACI to alternative treatments. There was still no significant difference in the outcome.

We keep complaining that ACI is not available in Canada, but in our practice we find that we refer only a couple of people a year for ACI to Tom Minas in Boston. These are usually after a failure of microfracture treatment. I think that waiting until the scaffold patches are available may be the best option.

### **References**

G. Knutsen, L. Engebretsen, T.C. Ludvigsen, J.O. Drogset, T. Grontvedt and E. Solheim *et al.*, Autologous chondrocyte implantation compared with microfracture in the knee: a randomized trial, *J Bone Joint Surg* 86A (2004) (3), pp. 455–464

Autologous chondrocyte implantation: a systematic review A. Ruano-Ravina Ph.D. and M. Jato Díaz M.D Osteoarthritis and Cartilage Volume 14, Issue 1 , January 2006, Pages 47-51

### **Journal Club Articles**

#### **Arthroscopic Transtibial Posterior Cruciate Ligament Reconstruction with Preservation of the Posterior Cruciate Ligament Fibers. Clinical Results of Minimum 2 Year Follow-up.**

Jin Hwan Ahn MD, Hyung Seop Yang, MD, Woong Kyo Jeong, MD and Kyoung Hwan Koh, MD. *American Journal of Sports Medicine* Vol 34 No 2 2006

The transtibial PCL reconstruction has been criticized for the “killer turn” effect of the graft bending around the back of the tibia. In his lab study Bergfeld found that the graft was attenuated and thinned after cyclic loading. This potentially could be a cause of failure of the graft. This was the impetus to switch to the posterior inlay technique for reconstruction of the posterior cruciate ligament.

Ahn has presented his 40 month follow-up of augmentation of the existing ligament with hamstring or allograft. The Lysholm improved to 92. The IKDC subjective showed that all were normal or nearly normal. The IKDC objective showed 97% normal or nearly normal. The repeat MRI showed good graft thickness around the back of the tibia. This was also confirmed on second look arthroscopy in 42 of the 61 patients.

The conclusion was that augmentation of the existing ligament with preservation of its fibers did not lead to attenuation of the graft around the back of the tibia. Furthermore, the clinical results measured by the IKDC scoring system were excellent.

Editors comments. This is an excellent paper showing above average results for PCL reconstruction. The author is a superb arthroscopic surgeon, and with his technique of removal of the posterior septum, makes the back of the knee look like the front. I think that it is a technique to consider when there is good bulk of the ligament still present. This concept fits well with the new thoughts about preservation of the remnant of the ACL.

One common clinical situation is in the athletic injury where only the anterolateral bundle is torn producing a 2+ posterior drawer with a good firm end point. If this is associated with a posterolateral corner injury the patient will often be symptomatic. The PCL can be augmented and the posterolateral corner reconstructed, and a good result can be anticipated.

### **A Meta-analysis of Stability After Anterior Cruciate Ligament Reconstruction as a Function of Hamstring Versus Patellar Tendon Graft and Fixation Type.**

Chadwick Prodromos, MD Brian Joyce BA Kelvin Shi MS and Brent Keller BS BA  
Arthroscopy Vol 21 No 10 2005

The current consensus has been that the hamstring graft has more laxity compared to the patellar tendon graft. When evaluated in the lab the size and strength of the 4 bundle configuration of the hamstring construct is stronger than the patellar tendon graft. The meta-analysis of the comparison papers that have been published in the past have all been of inferior methods of soft tissue fixation. This paper looks at the improvement in stability of hamstring grafts using the latest generation of fixation devices.

There were 24 four bundle hamstring graft papers compared to 32 patellar tendon papers. The KT was consider normal at 2 mm or less and abnormal was greater than 5 mm. If the series had 80% normal and 3% abnormal, it was considered to be high stability.

In the meta-analysis, four of the hamstring papers had a higher stability rate compared to the patellar tendon series. The hamstring groups were fixed with

the closed loop endobutton on the femoral side, and the second generation of tibial fixation, such as cortical screws or the intra-fix on the tibial side. They further looked at the sub-group of aperture fixation and found that this was not more stable than the endobutton or the cross pin fixation.

Editors comments: This is really the first paper to look at the current method of hamstring graft fixation, and compare it to the patellar tendon fixed with interference fit screws. The authors went back to re-analyze the Freedman paper that stated the BTB was more stable. When they removed the 2 bundle hamstring graft group, the results showed the four bundle hamstring graft equal to the patellar tendon graft. This again reflects the improvement in the current fixation of the soft tissue grafts.

The only remaining difference in the 2 grafts is the post-op weakness in full flexion after the harvest of both hamstring tendons.

### **University of Ottawa Sports Medicine Visiting Professor**



Fig 3. The residents, fellows and staff with Dr. Freddie Fu

This year we were entertained by Dr. Freddie Fu. He has such a passion for the double bundle ACL reconstruction that it is contagious just to sit near him. I have heard the presentation several times now, but continue to learn each time that I hear about the anatomy, and the number of ways that the ACL can be torn. It certainly explains why only a portion of the ligament can be torn by certain mechanisms such as hyperextension, and valgus with either internal or external rotation. Now that Freddie has been looking critically at the pattern of the ACL tear he says that there are 50 different ways that the ligament may be torn. Both bundles may be torn proximally, in the middle, or distally. Then each individual bundle may be torn proximally, in the middle or distally. Then there may be combinations of these, AM bundle proximal, and PL in the middle, and so on. He now takes the time to identify the tear pattern, before the shaver is introduced, and all the evidence is gone. When you take the time to look at this carefully, it gives you a good appreciation of the double bundle anatomy. We have done several cases where only one bundle is reconstructed. (see below) This is an easy procedure, and in the past, the shaver would clean out the notch, and we would do a standard reconstruction. One of my reservations about doing double bundle for everyone is that sometimes the gracilis tendon is just too small to be

an effective PL bundle. I think in that situation we should revert back to the standard 4 strand single tunnel hamstring reconstruction. The gracilis is probably OK as an augmentation for the semitendinosus, but not to stand alone.



Fig 4. The double bundle jacket.  
With Freddie, it is double everything, including his sport coat. Fig 4. This has a zip in lining, so that he doesn't have to carry an overcoat.

Freddie may be on to something with the injury pattern analysis, and he has stimulated us to closely examine the remnant of the ACL. In about 40% of the chronic cases there is no ligament left to examine. These 2 cases below teach us something that we missed.

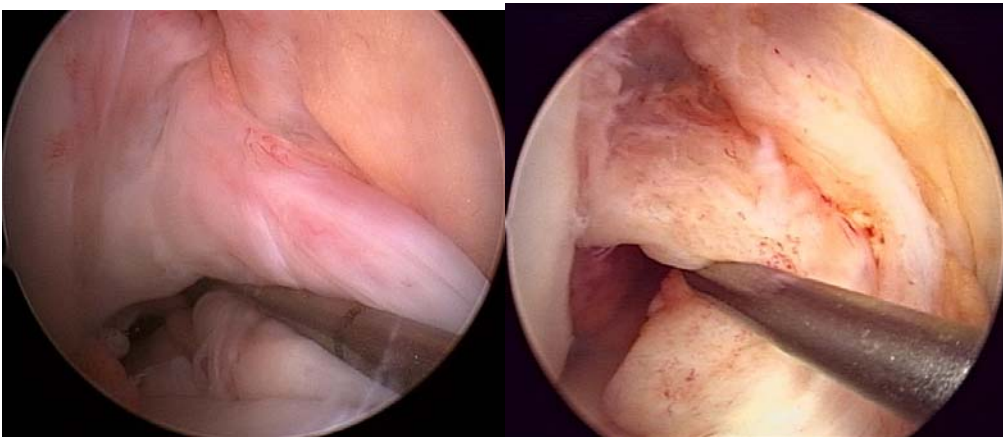


Fig 5 and 6. The intact posterolateral bundle of the ACL.

In the past we would have just removed, with the shaver, the entire ACL remnant in about 2 minutes. Now, after listening to Freddie Fu, and looking at the injury pattern, this is an isolated tear of the anteromedial bundle, with an intact posterolateral bundle. This pattern is not all that uncommon. The patients all present with symptomatic knees, and a KT-1000 SSD greater than 5 mm, but with a pivot glide. The posterolateral bundle appears intact. Professor Shino

asked me at a recent meeting how I could tell if the bundle was normal. Good question. There is no easy way to tell, except with experience. The clinical presentation demonstrates positive Lachman, but only a mild pivot shift. The remnant is examined closely and probed to check the integrity and tension in the ligament. The best position is in the figure 4 position. Fig 5 and 6. The reconstruction is done in a standard fashion using a double looped semitendinosus graft. This is placed in the 11, or 1 o'clock position.

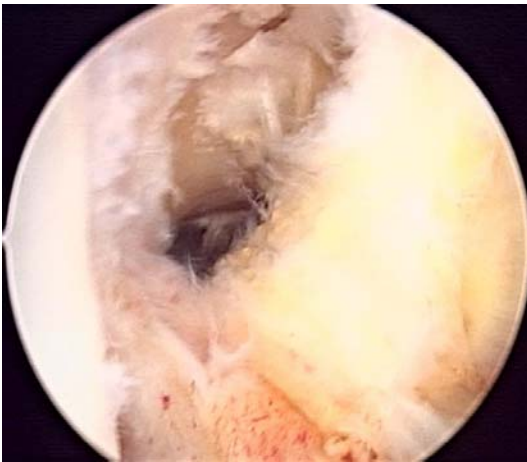


Fig 7. The 11 o'clock position on the femur is identified.



Fig 8 The doubled semitendinosus is used to reconstruct the anteromedial bundle.

### **Repair of the Meniscus that is torn at the meniscal capsule junction.**

The tear of the posterior horn of the medial meniscus at the meniscal capsule junction is a difficult tear to repair. The rigid fixators are contra-indicated, as there is no peripheral rim to gain fixation. The FastFix could be used, but it is a deep plunge at this position. The spectrum hooks through the posteromedial portal

could be used for this repair, and in fact they were originally designed for that indication. However, after ours have been beat up digging into the anterior glenoid, they are pretty dull. The other option is to pass suture from the anteromedial portal, with an 18 gauge spinal needle. The spinal needle is pushed through the meniscus from the front, and the capsule is picked up with a grasper through the posteromedial portal, and pushed over the tip of the needle Fig 10. The sutures are retrieved through the posteromedial portal, and tied with a knot pusher. Fig 11 and 12.

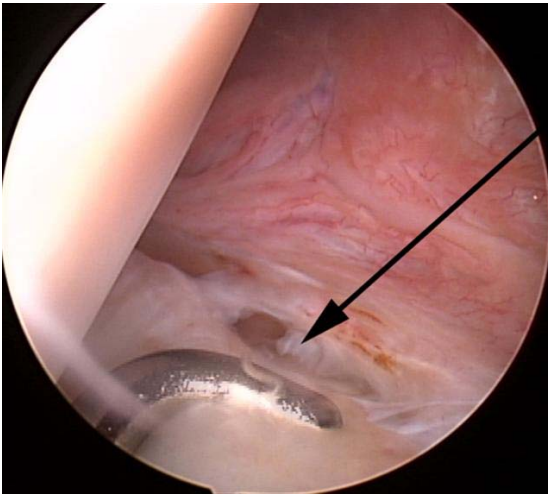


Fig 9. Meniscal capsule junction tear viewed through the notch.

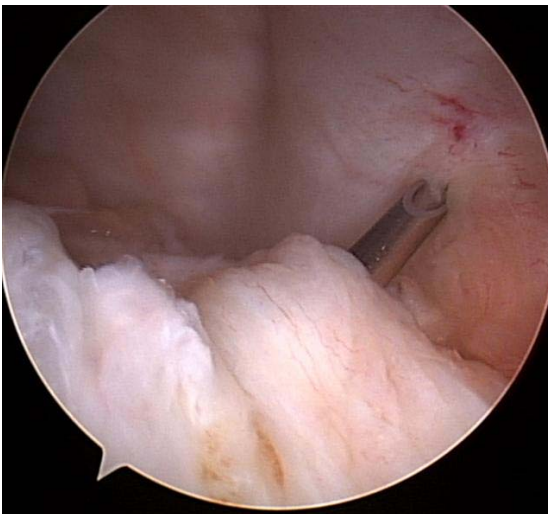


Fig 10.. The spinal needle through the meniscus and capsule

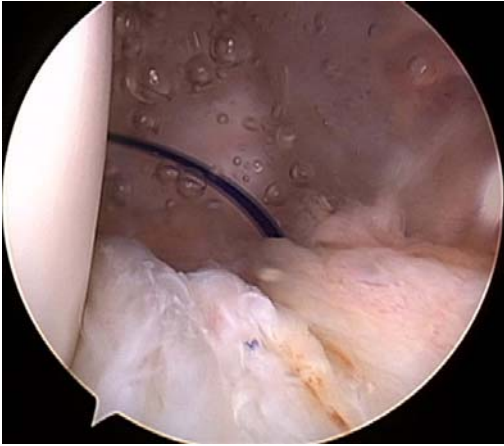


Fig 11 The sutures are pulled out through the posteromedial portal.

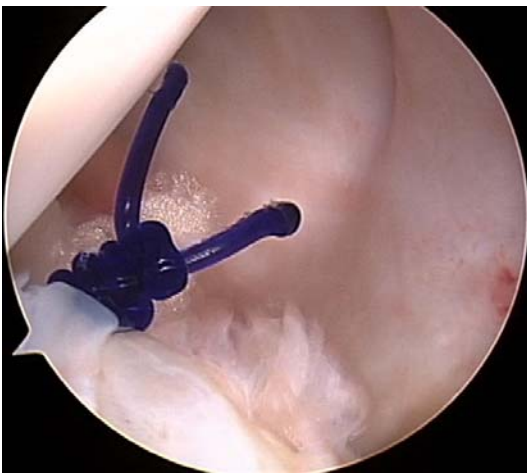
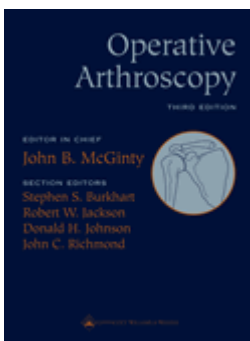


Fig 12. The completed suture repair.

**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.

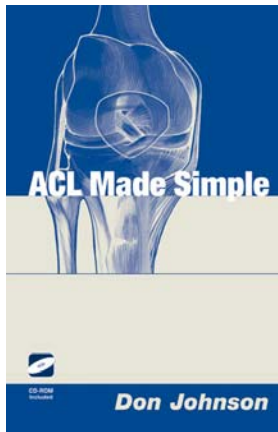
See full description at:

<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-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)