



Editorial.

Are we as good as we think we are at placing the tunnels in ACL reconstruction? Is the answer computer assisted surgery?

What do we know in 2006 about our accuracy in tunnel placement? Dieter Kohn from Germany found that surgeons drilled the femoral tunnel incorrectly 50% of the time, and the tibial tunnel incorrectly 25% of the time. Chris Harner reported in a paper at ESSKA this year, that he had to change his tibial guide wire 43% of the time. Jurgen Eichhorn found that inexperienced residents and fellows could more routinely place the tunnels in the correct position using the Orthopilot. This has a short learning curve, and Jason Koh says that it only takes an addition 5-10 minutes of operative time. Plaweski from France did a randomized trial to compare navigated versus non-navigated tunnel placement, and found improved outcomes using navigation. In the navigated group 97% had 2 mm SSD on KT-1000 evaluation compared to 83% in the non-navigated group. Most surgeons in North America are only doing 1 ACL reconstruction a month. It makes sense that the inexperienced, or infrequent ACL surgeon could benefit from computer assisted help.

It certainly points to the future use of navigation in ACL reconstruction. This field is in its infancy and we need to keep a close eye on the development. Don't blink or you may get left behind. The same holds for the double bundle ACL reconstruction. Just keep watching, and try not to jump on the early bandwagon. Is computer assisted navigation going to help in the double bundle ACL reconstruction? Ishibashi has used the Orthopilot to intra-operatively assess the double bundle hamstring ACL reconstruction. He found that the PL bundle works

mainly in extension, whereas the AM bundle works throughout the range of flexion. This explains why in most cases the isolated single bundle AM reconstruction has worked well. Adding the PL bundle improved their results, especially in extension and in controlling pivot shift.

What has been my experience?

In most cases we have been using the Howell tibial guide to avoid roof impingement. Fig 1. In the past this usually placed the tibial tunnel in a satisfactory position, but recently with the emphasis on a more medial position on the exterior of the tibia I have been concerned that it has been placing the k-wire too medial and posterior. Over the past few years we have been edging the tibial tunnel more posterior to avoid roof impingement; but, this can be overdone. Figure 2 shows some PCL impingement due to the posterior placement of the tibial tunnel. Steve Howell has modified the guide sleeve to have 3 positions to place the tibial guide pin, making it more anterior and lateral. I think that I may switch back to the Linvatec tibial guide as I think that I can place the tunnel where I think it should be. This is still very subjective, as evidenced by Jason Koh asking us at one point in a demo at the learning center in Chicago of the Orthopilot system, do you think that this is the best position for the femoral AM tunnel? I thought that that should be solved by the computer software program. Maybe the best answer is to use fluoro, (Brainlab) and reference off the bony anatomic landmarks.



Fig 1 The Howell tibial guide is drilled with the knee in full hyperextension.



Fig 2 The hamstring graft seem to wrap around the PCL in flexion (due to posterior placement of the tibial tunnel).

PCL Study Group in Tuscany



Fig 3. The country side of Tuscany
Tuscany



Fig 4. The Borgo San Luigi

Borgo San Luigi

The PCL study group this year was hosted by Professor Marianni from Rome. The first couple of days were spent in Rome and then were bused to the Borgo San Luigi in Tuscany. This was a wonderful small hotel in the country side outside of Sienna. The meeting room was very up to date with wireless Internet access in the room. We were able to do side trips to Sienna, San Gimignano, and to a vineyard in Chianti. We have not traveled much to Italy and this was a great opportunity to experience Tuscany.

We decided to take the next meeting to the island of Mykonos Greece in June of 2008, under the leadership of Spiros. This should be a good meeting with some sailing around the islands planned for after the meeting.

We have been saying for at least 10 years that the PCL is 10 years behind the ACL. But, guess what? In 2006 we are pretty much in the same state of knowledge and surgical outcomes as 10 years ago. There is a trend to use 2 bundles on the femoral side, especially for the chronic cases. Allograft is the most common graft choice in North America. We emphasize looking for the laxity of the posterior lateral corner, with multiple clinical tests. Missing laxity of this corner will place excessive strain on the PCL graft, and eventually lead to failure. But, as we found out at the PCL study group we can't all agree on the examination! Professor Mariani sustained a PCL injury 6 months previously, and treated himself conservatively. Six well known PCL surgeons examined his knee,

and wrote their findings down. Everyone agreed that he had a grade 2 injury, but 2 out of the 6 felt that he had laxity of the posterolateral corner. This was demonstrated only by sitting the patient on the side of the bed, letting the knee flex to 90° over the side, and externally rotating the foot with the knees held together. This is a fairly significant problem if we can't agree on the examination of the posterolateral lateral corner. How can we expect to get consistent results in the surgical approach to this case if we all don't perform the same operation? Four out of the 6 would not have done the posterolateral corner, and 2 would reconstruct it. There is no imaging that can routinely demonstrate or measure this laxity. The Europeans feel that the Telos stress x-ray at 90°, with the foot externally rotated, can show the increased rotation. This is not commonly done in North America.

It further emphasizes the importance of doing all the tests for laxity of the corner, the dial test, at 30° and 90°, both prone and supine, the sitting on the side of the bed with the legs over the side, and knee flexed to 90°, rotating the foot externally, and manually rotating the proximal tibia externally. If one of these tests is different than the opposite side, it is probably significant.

Another interesting test for posterolateral corner laxity is to have the patient stand only on the involved leg, and the physician tap him on the medial side of the tibia. The knee will open up laterally, and the patient says that this reproduces his instability symptoms. Make sure that the patient is hanging on to someone in this single stance test.

Dan Cooper – HAL lesion

Dan presented the video of a dramatic hyperextension injury in an NFL player. This occurs in the player with normal varus and hyperextension of the knee. In spite of the severe appearance of the injury on the video, the ACL and PCL are normal. The question is whether you need to operate on the isolated injury to the posterolateral corner. Cooper feels that you don't need to operate. In this situation, the corner will heal sufficiently to allow the player to return to football without significant symptoms.

Walter Shelton – Allograft stenting of the PCL tear.

Shelton has done 21 cases of stenting the acute PCL injury with an allograft. He has had only 2 failures. The principle is to reduce the knee with this internal fixation, and allow the PCL and collaterals to heal in a normal reduced position. This is similar to the LARS PCL stent, without the problems of the potential revision of a synthetic graft. It is very difficult to revise a failed synthetic.

Greg Fanelli – USA - MTF Cascade system

Fanelli reported on the use of platelet rich fibrin (MTF Cascade System) for soaking the graft or sewing the clot into the graft in the tunnel. PRF has been shown to help with wound healing in the open injuries. He has been laying the clot in over the open repair of collateral ligaments. This is too early to judge if this helps with soft tissue healing, but is a step in the right direction.

Ron Arbel – Israel

Ron presented the difficulty with assessment and treatment of anteromedial laxity. The question is how to determine if there is any significant posteromedial laxity. You need multiple stress x-rays. This is not a very reliable method to determine the degree of laxity.

Weiler showed an interesting test for the anteromedial laxity. He flexes the patients knee over his own kneeling knee on the exam table. Fig 5. He treats these mild laxities with microfracture of the medial attachment of the MCL. (After Rosenberg) The more sever laxities have to be augmented with an allograft.



Fig 5. The anteromedial rotation test.

PCL dynamic brace – Jacob.

I was impressed with this brace that has been designed by Roli Jacob. It has a spring mechanism to push the tibia forward as the knee moves through a range of motion. The only drawback is that this is a fairly bulky brace. I think that it is preferable to the extension splinting that we now use.

Gliatis – Posterolateral corner reconstruction with the ‘Y’ ligament.

The Greek experience with the posterolateral corner was presented by Gliatis. The diagnosis was made by clinical testing of both the external rotation, measured by prone dial test at 30°, and the varus stress testing at 30° and full extension. More than 10° of side to side difference was felt to be significant. They had compared the surgical procedures (in cadaver testing) of Clancy, Warren, Larson and the Lars (Mueller by-pass)

The external rotation was measured before and after the procedure by the rotationometer of Beacon.

The results were that the Clancy procedure did not correct the rotation. The Lars and Larson did correct. The Warren procedure had the best correction of external rotation, but could overcorrect. The Lars Y ligament was used to correct the posterolateral corner laxity for both the varus and external rotation.

They had preformed the surgical procedure of the 'Y' synthetic ligament reconstruction on 18 patients in both acute and chronic situations, with 38 months of follow up. The Lysholm scores were 82-90, with no failures. These are promising results in the acute cases. But what about the long-term results?

Beacon – Reconstruction of the PLC with the 'Y' synthetic ligament.

He reviewed his use of the 'Y' synthetic ligament for the posterolateral corner. He has done 177 cases with only a couple of failures. No detailed results were presented. He feels that over constraint is bad, and he does not use metal interference screw for fixation in the tunnels.

George Dowd – UK Posterolateral Reconstruction.

Dowd presented his 19 patients who had a PCL/PLC stabilization. He felt that these were fairly good results with only 2 failures in 2-9 year follow-up.

He felt that the problems with reconstructing the PCL and PLC are:

The complex double bundle anatomy of the PCL is hard to reproduce.

The popliteus is a dynamic structure that is replaced by a static sling.

What is the best objective assessment of the PCL and posterolateral corner?

Should we use stress x-ray with external rotation? How do we accurately measure this rotation? The routine varus and valgus stress x-rays are unreliable due to rotation of the tibia. Some of the participants felt that stress x-rays near extension will give more information about the posterior translation. We are obviously still some time away from good outcome measurements on this difficult problem of reconstruction of the PCL and the posterolateral corner.

Ganglion of the ACL or PCL – Krudwig

He presented 92 cases of ganglion cyst of the cruciates. 72% originated from the ACL and PCL, with the ACL the more common site. Some can also originate from the meniscus, fat pad, etc. The cyst can only be diagnosed with MRI. What is the etiology? They may originate from the fibers or sheath of the ligament. The cyst can be symptomatic, or asymptomatic finding on MRI.

The symptomatic cases require arthroscopic treatment, by debridement/excision of the cyst.

Jung and Weiler - Germany

Weiler reviewed his PCL reconstructions and found that it was more successful in women compared to men. No factors that could be identified for this difference. None of the others in the group had noticed this gender difference.

Consensus statements

We had hoped to come to some agreement from the group on a couple of issues, but I think that we just agreed to disagree.

The first consensus concerned the grading, and which PCL lesions you would operate on based on the grading system. Most agreed about the PCL drawer more than 2+, but as evidenced by the disagreement on the clinical examination of the external rotation, no one was definite about when to operate for the PLC. It seems that up to 10° may be normal, and more than that should be considered abnormal. If you can detect increase in ER, consider that abnormal. The Europeans use stress x-rays more in the varus and valgus, and even rotation views. We tend to only use the straight posterior measurements.

When it came to the consensus on rehab, we had even less agreement. I don't think that we have really given much thought to the lesions repaired and how to rehab after surgery. There is certainly no evidence to any of the PCL rehab protocols. It will be interesting to see how Professor Mariani analyses this data.

Apology

In the Vol 10 no 11 issue of Practical Arthroscopy Dr. Smith wrote an article about the operation for MCL laxity. He reported on a case that was done with the technique described by Dr. Yoshiya, and was published in AJSM Vol 33, no 9, 2005, p 1380-1385. He used this fig 3 which should have been attributed to Dr Yoshiya. I apologize to Dr. Yoshiya for this oversight.

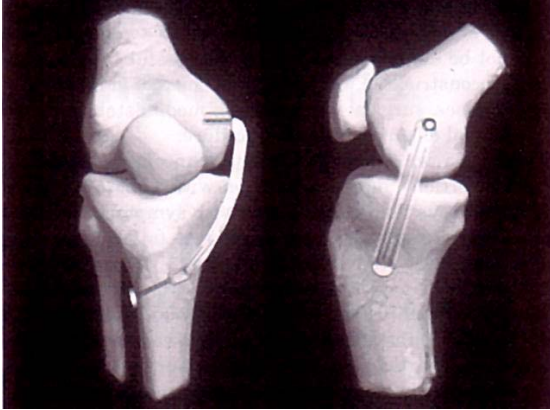


Fig 3. The graft is anchored to the femur and sutured to the tibia.
A case example, courtesy of Dr. Alan Liew, of the reconstruction of an isolated MCL is presented by one of our fellows, Dr. Derek Smith.

Upcoming Meetings

- **AANA Fall Course - November 9-12, 2006**
JW Marriott Desert Springs Palm Desert, California Contact www.aana.org