

May '01 Newsletter Editorial

I have just had a marvelous month of traveling, visiting, eating, and drinking with many of my friends in different countries around the world, and have to thank everyone for the wonderful hospitality. I have finished sorting and archiving some 3,000 digital pictures! Just think of the potential to bore people with my extensive slide shows. I am now back to reality, cranking out the ACL's, but it does give me some copy to fill the newsletter.

I still have not heard from many about the electronic format, a pdf file that could be read online with beautiful high resolution color photos. Doesn't anyone want to receive the newsletter in the pdf format?

The Residents and Fellows Meeting on Useppa Island FI



No, this is not how good the fishing was during the meeting, this was courtesy of Steve Snyder who had a long flight back to California and lots of battery time on his computer. The papers were of high quality and there was good debate following some of the more controversial papers. The following is a brief summary of a couple of the interesting papers.

The effect of meniscus status on knee stability and function after ACL reconstruction – Howard Wu

This study looked at 61 patients with patellar tendon reconstruction to examine the meniscus status and the function and stability at late follow-up of 10 years. There were more symptoms in the patient with meniscus excision. The IKDC scores were lower for any degree of meniscus resection. There was no significant difference in the KT manual max related to meniscus resection. Compared to Shelbourne's study, all patients with meniscectomy had x-ray changes. The conclusion was that the long-term functional result correlated to the meniscus status, but this did not affect the stability.

Thermal Shrinkage of the ACL – Bret Sokoloff

The intact lax graft or partial ACL tear in 35 patients was treated with bipolar thermal. The results:

6/29 primary native ACL's failed – 20%

0/9 grafts failed

10/35 lowered sports activities

This study contradicts the study by Thomas Carter, who found that most grafts that were shrunk failed. There is no explanation, but the technique of painting vs grid application of the heat may be important.

Arthrometric results of ACL reconstruction using patellar tendon – Nikhil Verma

In this study of 293 patients, the KT results after a patellar tendon reconstruction were examined. The results showed that 38% of the patients had knees that were tighter than the opposite side, but only 4% were greater than 10 mm. There was an 11% re-operation rate. 4% had a flexion contracture.

This group of knees that is tighter than the opposite side is worrisome. The worst long term results are the knees that are too tight, and painful. Are these tight knees the result of the surgical procedure or the rehab? There is a recent suggestion that knees that are more than 2 mm tighter than the opposite side be reported as failures!

Transphyseal ACL reconstruction in the skeletally immature patient. Jeff Thompson

This study was a retrospective chart review of 36 patients who were less than 15 years of age who were reconstructed with transphyseal tunnels on both sides. The results:

24/36 returned for clinical examination.

Average age 14 years.

6/31 failed. 24/27 had <3mm KT

growth plate status – open in 12, partially open in 12

no angular deformity – some were short

The conclusion of the study was that the degree of open plates did not correlate with the outcome or result in any angular deformity.

Revision ACL reconstruction using a PLLA screw – Schuyler DeJong

Barber and Warden reported in Arthroscopy '99 that there was no resorption of the bioabsorbable screw by MRI. If this is true, what happens at the time of revision when you have to drill out all, or a portion of the old screw, and insert a new screw adjacent to the old one.

The purpose of this study was: Can you drill out a portion of the screw for a new tunnel and still achieve adequate fixation with the new screw? The results showed that with an average of 34% by weight of the screw removed, the revision fixation was stronger than the primary fixation.

Accuracy of Intra-articular Needle Placement in Hyaluronic acid injections. Blair Rhode

The question was - how accurate is the office joint injection of hyaluronic acid? The answer was that about 1/3 of the injections missed the joint. The placement was confirmed with dye and the image intensifier. It was found that longer needles were better (2 inch) and that the anteromedial portal was the best injection site.

The outcome of untreated traumatic articular cartilage defects of the knee. A 12-year natural history study. – Sanjiv Jari

This paper won the award for the best paper of the meeting. It is the usual well-done paper from Don Shelbourne. The question was what is the outcome of the untreated localized chondral lesion seen at the time of ACL reconstruction? This study looked at 34 patients out of 2264 ACL reconstructions who had an isolated defect of the femoral condyle. This was compared to a control group of patients who had no meniscus or chondral defects. The results:

- ?? The subjective scores of the chondral defects vs. the control did not deteriorate over time.
- ?? Tegner activity level was 8 at 7 years follow-up. There were no differences between the 2 groups. 96% returned to same sport, some at a lower level
- ?? X-ray assessment of the knees showed no difference between the 2 groups. 5 showed progression (one in the non-involved knee)
- ?? There was no difference in subjective, objective, functional or radiographic evaluation.
- ?? Defect size – 12 were 1.5 cm 6 were 2.25
- ?? None of these cases went on to further treatment.

The conclusion was that there was no harm with non-treatment over 12 years of follow-up. The obvious question, now that we know that the outcome of the untreated lesion is good, when do we treat these defects? It would appear from this study that we don't.

Report from the Spring AANA meeting in Seattle

Shrinkage of the ACL. To shrink or not to shrink?

Bartolozzi presented his results of thermal shrinkage of 12 patients with partial ACL tears. The clinical examination revealed a 1+ Lachman with a pivot glide test. (a stable knee) The KT-1000 had a side to side difference of 4.5 mm. The arthroscopy revealed more than 50% of the ligament remaining. The ACL was shrunk using a monopolar Oratec probe. No details about the method of shrinking, ie painting or hatching. The latter leaves normal tissue (and blood supply) between the treated tissue. The KT was measured at the end of the shrinkage procedure to confirm the effect of thermal treatment.

The results at 15 months showed that only one patient had a grade 2 Lachman, a positive pivot shift test and symptoms of instability. The remainder of the patients showed improvement in the KT-1000 from a 4.5 mm pre-op to 1.7 mm post op. The Lysholm score was 90, the Tegner was 5.4, and the Cincinnati scale was 83.

The conclusion was that this was an acceptable procedure for these partial tears in recreational athletes. This study would have been stronger if the group of thermally treated ACL's were compared to an untreated group of partial tears. The published results of stable partial tears with greater than 50% of ligament remaining (ie this study group) is good without any treatment.

ACL reconstruction in the Skeletally Immature Patient.

Peter Simonian presented an overview of ACL reconstruction in the skeletally immature patient. The concern is in the prepubescent patients of

Tanner 1, age <10 years, and Tanner 2, age 10-13 where there is potential of premature epiphyseal growth plate closure and subsequent angular deformity with continuing growth. Simonian reviewed the existing literature and made the following points:

- Postpubertal patients who are nearing skeletal maturity should be treated as adults.
- Treat partial tears conservatively, especially if stable
- Drill holes as small as possible
- Centrally placed tunnels are less likely to cause angular deformity with growth.
- Only soft tissue grafts should traverse the physis. Bone blocks or fixation devices that traverse the physis are more likely to cause growth arrest.
- Extra-articular procedures that require extensive dissection or fixation devices near the physis may be more damaging than transphyseal tunnels.
- A careful follow up plan must be in place to monitor the growth and plan for intervention if premature physeal closure occurs.

Based on this knowledge, Simonian recommends using the hamstring tendons through a central tibial tunnel, and a normal endoscopic femoral tunnel. Proximal femoral fixation is done with an endobutton, and distally with sutures tied over a post.

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Thermal Shoulder

In a word, the summary from the papers on thermal capsulorrhaphy is **caution!** Stephen Weber kicked the session off with his summary of the 15 patients who had been referred to him with complications of thermal treatment of the shoulder capsule. This paper was reported in the last issue of *Practical Arthroscopy*, as the poster presentation from the academy. None of these

complications are seen after suture capsulorrhaphy and the 3 patients with large defects in the capsule are particularly difficult to manage.

The next paper by Miniacci reported on 19 multidirectional instability patients who had thermal capsule shrinkage with a monopolar device. The high failure rate, 9/19 or 47%, have prompted the authors to abandon this technique for multi-directional instability, especially for the posterior patients.

The paper by Fu demonstrated that the proprioception was maintained after thermal shrinkage of the shoulder capsule.

Paulos compared the laser and RF thermal treatment of the shoulder capsule for instability. The laser group had 5/20 or 25% fail, and the R-F group had 7/20 or 35%, fail at a 36 month follow up. The conclusions from this group was that the thermal procedure should be limited to the treatment of the redundant capsule. The Bankart lesion should be repaired in a traditional fashion.

The Management of Chondral Injuries

Tom Minas gave his overview of biologic joint replacement in the current treatment of articular cartilage. His practice is largely the young athletic end of the road knee. Because of this unique patient profile, he is pushing the limit of the normal algorithm for cartilage treatment. However, that said, his algorithm is fairly traditional. The young patients will initially get a marrow stimulation procedure, such as microfracture, before the osteochondral transfer or chondrocyte transplantation.

Chondral injury – symptomatic and either < 2 cm or > 2 cm

< 2 cm – low demand - chondroplasty < 40 years of age – marrow stimulation -> OATS/ACI

< 2 cm – low demand – chondroplasty > 40 years of age ->OATS/ACI

< 2 cm – high demand < 40 years of age – marrow stimulation ->OATS/ACI

< 2 cm – high demand > 40 years of age – OATS/ACI

> 2 cm – marrow stimulation – poor results > 40 years or > 3 cm lesions

> 2 cm -> ACI -> re-do ACI -> osteochondral allograft

Minas classifies the patients into:

Simple – single grade 3 or 4 lesions on the femur

Complex

- multifocal unipolar lesions
- unipolar lesions on patella or tibia
- OCD
- Correction of malalignment

Salvage

Bipolar lesions

Joint space narrowing with osteophytes

Generalized chondromalacia grade 2 or greater

Results:

Treatment failures

Simple – 2/12

Complex – 8/86

Salvage – 12/71

Overall – 22/169 = 13%

Four patients eventually had a total knee replacement. You can see that most of his cases are the complex, multiple lesions with associated osteotomy, or the salvage cases. The end result of these patients, average age of 39 years, was that only 4 had a total knee replacement. In his hands this seems to be an effective treatment for these young patients with worn out knees. The patient satisfaction level is high, and 80% of the complex patients would chose to have the operation again.

Another paper by Levitz reported on his results of cartilage treatment using a pre-determined algorithm. This is almost identical to the one used by Minas. Athletic patients underwent microfracture in addition to the chondral debridement with good results. The lesions < 2 cm that were failures were treated by osteochondral transfer. The failed lesions > 2 cm were treated with chondrocyte transplantation. The patients with osteochondritis were managed in the following fashion, in-situ lesions -> drilled, partially detached lesions -> ORIF, and fully detached lesions -> microfracture. The failures of this management were allocated to the <2cm and >2 cm as above. The message from this paper is if you follow the algorithm, you can expect good results. It is too bad the 3rd world countries (such as Canada) can't afford the chondrocyte transplantation! The last, and most important, part of the algorithm is left out.

Bergfeld reported on his results with 26 patients who had osteochondral mosaicplasty. These patients were mostly failed previous procedures, with large lesions, average 2.5 cm, using an average of 4 grafts (4.5mm in size) This study pushed the size of osteochondral grafting to over the 2 cm limit, but reported good results in pain improvement, patient satisfaction and MRI appearance.

In the last issue of Practical Arthroscopy, I asked the question concerning the management of the failed microfracture for the >2 cm lesion of osteochondritis dissecans. Based on the above information it seems that either the mosaicplasty, or ACI would be appropriate treatment.

Do Pain Pumps Work?

Alan Barber addressed this question in this paper that compared placebo versus marcaine to control postoperative pain. The outpatient shoulder procedure patients were randomized to pain pumps with either saline or 0.5% bupivacaine. The catheter was left in for 48 hours and delivered 2 ml per hour. The VAS, categorical pain scale and oral medication use was recorded. The marcaine group had statistically lower pain scores at all recorded times up to 7 days. The maximum pain was recorded in the first 2 days, and the pain pump showed significant reduction of pain during this critical time.

Does Cyrotherapy Work in the Shoulder?

In this study Kevin Speer measured the post-op intra-articular temperature with indwelling catheters in the shoulder. There was a statistically significant reduction in the temperature of the joint in the first 48 hours post-operatively. His conclusion was that cyrotherapy could reduce the intra-articular temperature, and this reduction in temperature is beneficial to reduce the post-op pain.

Re: The localization of the medial portal with a needle

Jim Chow responded to the article about the large bore needle carrying a piece of skin into the joint. For years he has used the needle technique to

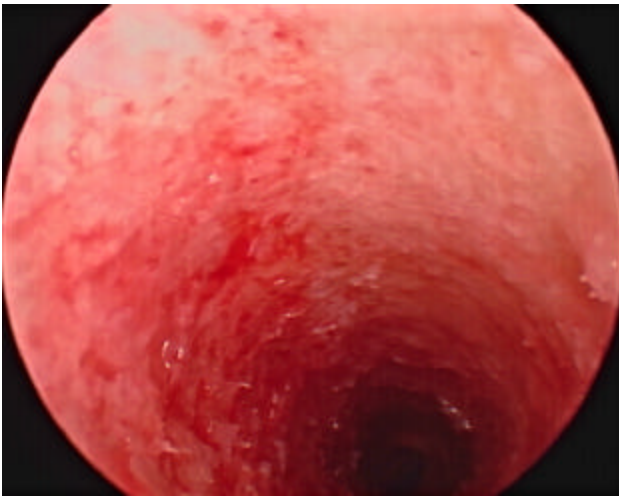
localize the portal before making a knife cut. His caveat is that he always uses a trochar in the needle. This prevents the core biopsy of the skin.

Pivot shift test

Have you ever wondered why the pivot shift in a chronic ACL deficient knee is not as positive as you thought it should be? The scenario is that you find the Lachman test is very loose, but the pivot shift test is only a glide. The patient has a chronic ACL deficient knee and lacks a few degrees of extension. The arthroscopy will show you why the knee does not pivot. A displaced bucket handle tear of the meniscus prevents the tibia from sliding anterior to give the gross pivot shift expected. We see a lot of these with our long wait lists.



Dilation of the tibial tunnel

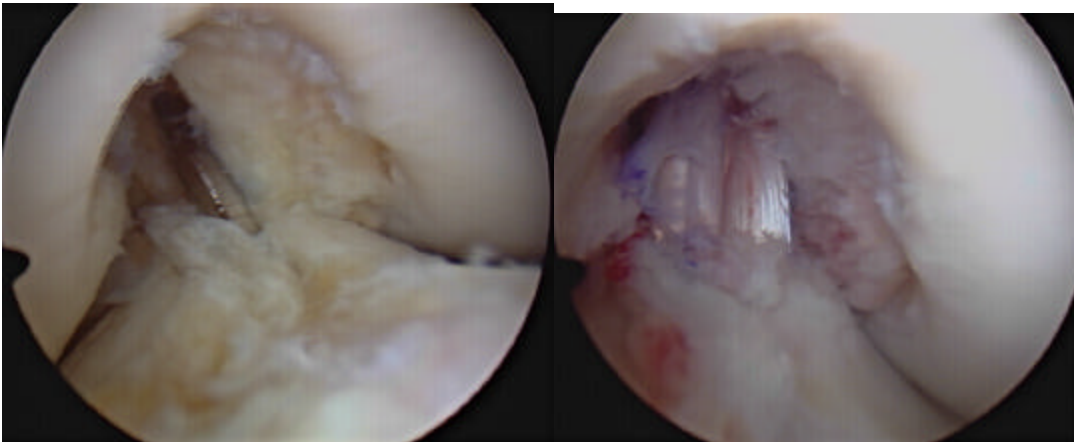


This is how the tibial tunnel should look if you use interference fit screws and hamstring grafts. This tunnel has been dilated 2 sizes to produce a firm tunnel wall, improving the load to failure of interference fit screw fixation of soft tissues.

Notchplasty



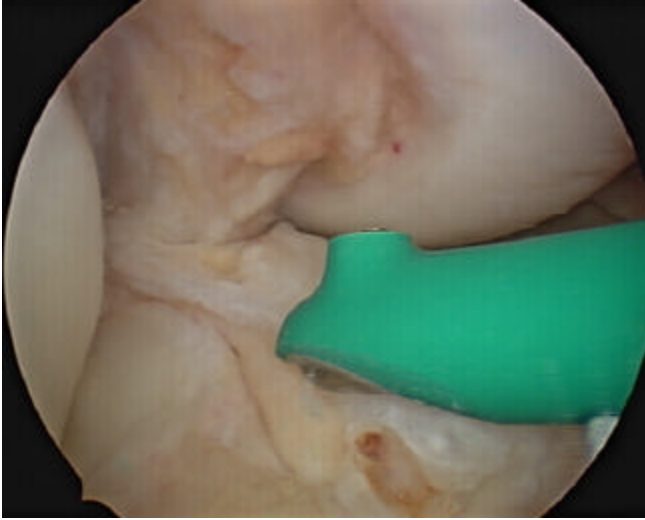
This is a view of a notch of a young athlete with a chronic ACL tear. She had the opposite knee reconstructed 2 years ago. This is not a stenotic notch and can't be blamed for the ACL tear. The other important point is that she does not need to have an extensive bony notchplasty performed. If the tibial tunnel is placed in the correct position, then this notch will accept a 4 bundle hamstring graft without removal of bone.



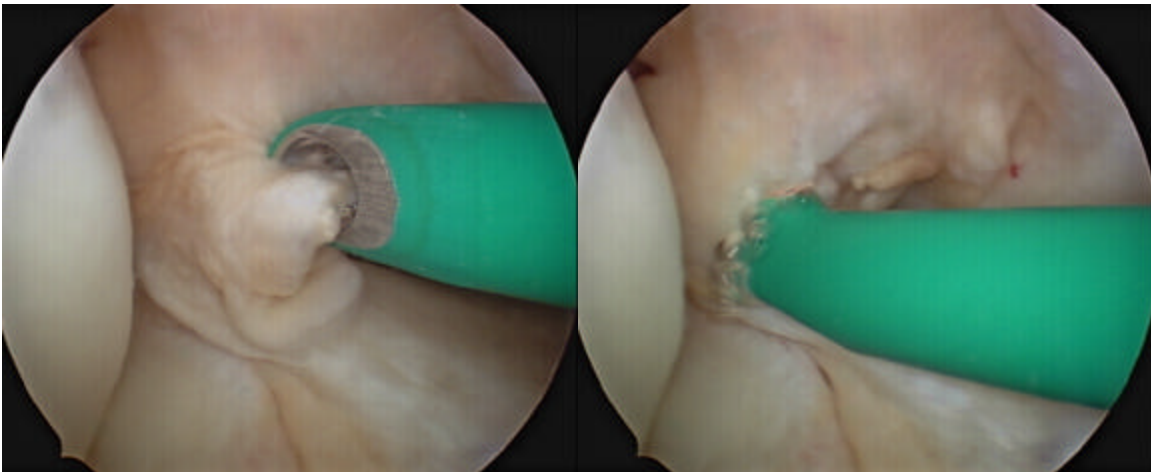
The left view is the confirmation of the correct position of the guide wire that was inserted with the tibial guide. The finished hamstring graft viewed at about 30* of flexion.

Preparation of the notch

The shaver and the electro surgical ablator are the 2 common instruments used to perform a soft tissue notchplasty. Now this is available in one instrument – the trident.

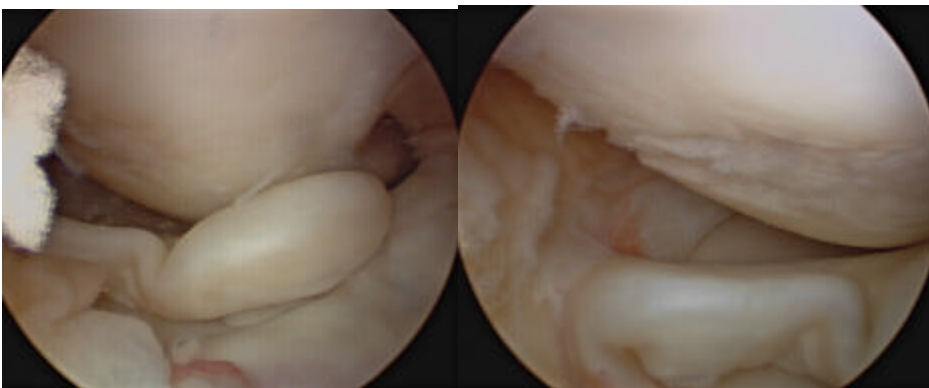


The trident is a 4.2 gator resector with an ablator electrode on the opposite side. You use the shaver in the normal fashion to remove the stump of the ACL, and when it bleeds, particularly behind the PCL, use the ablator to coagulate the vessel.



The shaving function shown the left and the ablation on the right.

The chronic bucket handle tear



Was there ever any doubt that walking around with a displaced bucket handle tear is bad for your knee? The 28-year-old patient waited for 2 years on the ACL list. Eventually he disrupted the posterior attachment of the bucket tear, but in the

meantime eroded the articular surface of the medial femoral condyle. Isn't socialized medicine great!

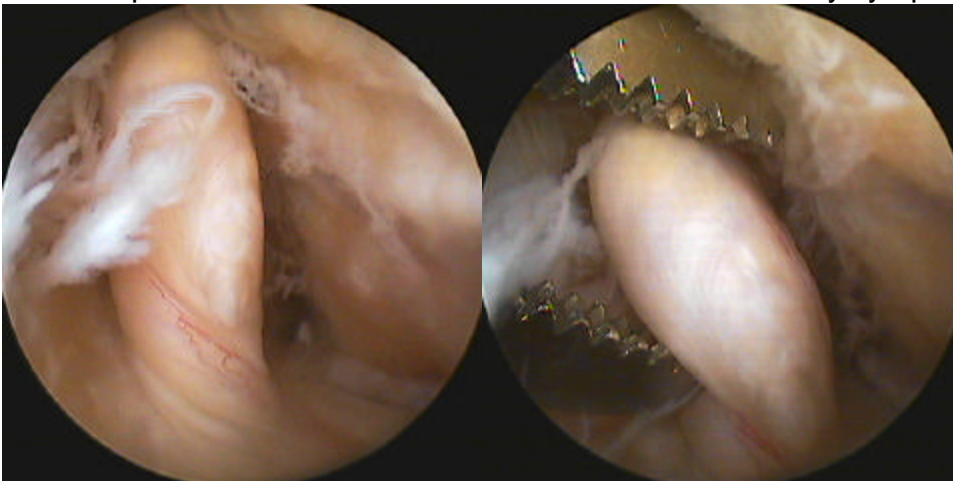
ACL shrinkage: Does it work?

The conventional wisdom seems to be not to shrink the chronic lax graft. (Tom Carter and others) However, the last couple of graft shrinks that we have done have worked out OK. (See also the paper by Bret Sokoloff from the residents and fellows meeting that is reported above)

This was a patellar tendon graft that has maintained the 2 mm improvement for the past 9 months. His knee was rescoped for the synovial lesion in the lateral gutter.



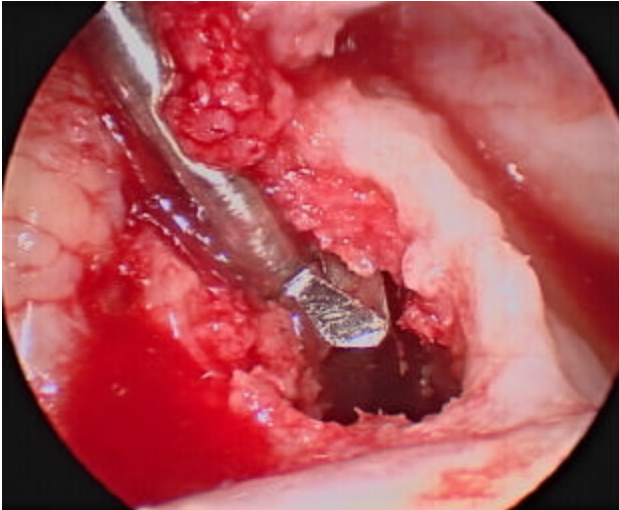
This is a typical looking patellar tendon graft after a few years. The thermal shrinkage was done 9 months previously. The multiple puncture technique using a meniscus hook tip was used to heat the tissue in multiple points about 2-3 mm apart. Normal tissue was left between. This is the grid principle that is used in the shoulder. The improvement in the KT was only 2 mm, but has been maintained over this period of time. His knee is stable with no instability symptoms.



This was the synovial lesion in the lateral gutter causing catching and snapping.

Ovalizing the Tibial Tunnel

If you are placing the tibial screw in the proximal end of the tibial tunnel be careful not to make the proximal end of the tunnel too large by reaming the internal aperture with the drill bit.



This is a photo of the inner aperture of the tibial tunnel with the guide wire and the tip of the drill bit about to come through into the joint.

After you have placed the guide wire through the femoral aimer and are pushing the drill bit up the tibial tunnel to ream the femoral tunnel, be careful not to ovalize the proximal end of the tibial tunnel. The guide wire will lie at the posterior aspect of the tunnel and directs the drill bit to this posterior region. Extend the knee slightly and try to push the drill bit past the cortex, rather than turn on the power and ream past. If you make this proximal end too large, the screw will not have a tight fit against the tendon.