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Pearls: How I Create the Tibial Socket for PCL Reconstruction

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Some of the most difficult aspects of PCL reconstruction are getting to the posterior aspect of the tibia, finding the anatomic insertion site of the PCL, and drilling the tibial socket or tunnel. The popliteal neurovascular structures are in close proximity. Because of this,

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Fig. 1 View from the anterolateral portal establishing the posteromedial portal with the “needle and knife” technique (black arrow). (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

exposure is critical to ensure safety as well as proper graft placement [1, 5].

Arthroscopy Portals

I typically create two anteromedial and two anterolateral portals when performing combined ACL/PCL

reconstructions. Having four portals provides the flexibility needed to ensure proper socket placements on both the femoral and tibial sides.

Tibial Socket Preparation

Once the ACL and PCL footprints are removed from the femoral side, I carefully resect the anterolateral and posteromedial PCL remnants with a 30° scope all the way to the level of the posterior horns of the medial and lateral menisci. Using a 30° scope

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Fig. 2 View from the anterolateral portal showing the insertion of a flexible cannula in the posteromedial portal (black arrow). (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

provides me with a more “normal” view of the intercondylar notch for cleaning off the femoral and proximal portion of the tibial PCL footprint. It is essential to have excellent visualization of both the posterior horns of the medial and lateral menisci to avoid damaging them. I then establish a posteromedial portal [4]. I place the 30° scope in the anterolateral portal, dim the OR lights (allowing for illumination of the scope), and place an 18-gauge spinal needle from the posteromedial aspect of the knee toward the PCL remnant. I observe the needle under direct visualization to ensure that it is not too close to the femoral condyle. If the posteromedial portal is created too close to the femoral

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Fig. 3 View from the posteromedial portal showing the position of the PCL tibial guide hugging the base of the PCL facet (black arrow). (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

condyle, it does not give enough freedom to move the shaver or radiofrequency device to clean off the tibial footprint properly. With the needle in the skin, I use a No. 11 blade is used to make a small 5 mm or 6 mm longitudinal incision, and place the blade directly above the needle until it enters the joint (Fig. 1). This allows direct visualization of both the needle and the knife, and ensures safety and avoidance of damage to the neurovascular structures. I remove the knife, leaving the needle in place, and then insert a cannula over a switching stick. Soft cannulas are preferred as they give more intraoperative flexibility (Fig. 2). I then use a 70° scope, as it offers improved visualization all the way to the base of the PCL footprint. I create a soft-tissue plane between the posterior midline septum and the

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Fig. 4 View from the posteromedial portal of the 2.4 mm guidepin (white arrow) at the base of the PCL facet as it hits the PCL guide (black arrow) which acts as a neurovascular protector. (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

posterior horn of the medial meniscus. This not only gives me more access to the back of the tibia, but also is a safety measure, as it moves the neurovascular bundle further away from the surgical field [2]. I use the shaver to remove as much of the PCL as possible, and then use a radiofrequency device to get right down on the tibial footprint until it drops off and the popliteus muscle and the mammillary bodies, which lie on either side of the tibial PCL, attachment are visualized. Once I identify the tibial footprint, I position the anatomic contoured PCL guide through the low anteromedial portal and hook the base of the PCL facet, capturing the entire tibial footprint (Fig. 3). Once the guide is locked in place, I drill a 2.4 mm guide pin with the 70° scope in the posteromedial portal. This allows direct

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Fig. 5A–B (A) View from the posteromedial portal showing the 11 mm retro cutting device (black arrow) at the base of the PCL facet as it hits the PCL guide (white arrow), which acts as a neurovascular protector. (B) View from the posteromedial portal showing the 11 mm retro cutting device in a flipped position (black arrow) at the base of the PCL facet. Note the tibial guide (white arrow) is still in place as a neurovascular protector. (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

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Fig. 6 View from the posteromedial portal of tibial socket (black arrow) at base of PCL facet (well below the joint line as denoted by the white arrow). (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

visualization of the guide pin as it enters the insertion site and ensures no neurovascular compromise [3]. I exchange the 2.4 mm guide pin for a 3.5 mm retro cutting device and drill it into the tibial guide (Fig. 4). I then release the guide (Fig. 5A) and use it as a neurovascular shield (Fig. 5B). I deploy the retro cutting device, ream the socket, (Fig. 6), and insert a suture for graft passage purposes (Fig. 7).

At this point, the tibial socket is completed. Intraoperative imaging shows the final ACL and PCL reconstructions (Fig. 8). Anteroposterior (Fig. 9A) and lateral (Fig. 9B) fluoroscopic images obtained postoperatively demonstrate final ACL and PCL fixations.

Access to the distal attachment of the PCL on the tibia requires excellent visualization not only to ensure proper

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Fig. 7 View from the posteromedial portal of the tibial socket with suture (black arrow) for graft passage. (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

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Fig. 8 View from anterolateral portal of ACL (black arrow) and PCL (white arrow) reconstructions. (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

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Fig. 9A–B (A) Fluoroscopic anteroposterior (AP) view demonstrating final ACL (black arrows) and PCL fixation (white arrows). (B) Fluoroscopic lateral view demonstrating final ACL (black arrows) and PCL fixation (white arrows). (Reprinted from *Operative Techniques in Sports Medicine*, King AH, Prince MR, Reardon PJ, Levy BA, Stuart MJ, All-Inside Posterior Cruciate Ligament Reconstruction, Article in Press, Copyright (2015), with permission from Elsevier. <http://www.sciencedirect.com/science/journal/10601872>).

positioning of the socket in its anatomic location, but also to prevent neurovascular injury.

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