


# Harvesting the Quadriceps Tendon With a Minimally Invasive Approach

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**Background:** This article describes a standardized, minimally invasive approach for harvesting the quadriceps tendon through a 2 to 3 cm transverse skin incision, presenting it as a viable option.

**Indications:** This procedure is indicated for patients undergoing anterior cruciate ligament (ACL), posterior cruciate ligament, medial collateral ligament, or lateral collateral ligament reconstruction surgery using soft tissue quadriceps grafts.

**Technique Description:** A transverse incision is made on the anterior face of the knee, followed by a longitudinal incision of the central third of the rectus femoris. We perform the distal detachment of the patella of the same tendon. Then, the tendon is extracted using a closed stripper. The graft is prepared and folded on itself, resulting in a double graft.

**Results:** Twenty patients, 16 male and 4 female with complete rupture of ACL, were submitted to an ACL reconstruction using the quadriceps soft tissue graft with minimally invasive harvesting technique. The results were satisfactory for all patients. All patients showed good evolution in the immediate and late postoperative period, with no cases of joint stiffness, wound dehiscence, and no infections.

**Discussion/Conclusion:** We can conclude that harvesting the quadriceps tendon with a minimally invasive approach is a valid and reliable option for the treatment of ligament tears of the knee.

**Patient Consent Disclosure Statement:** The author(s) attests that consent has been obtained from any patient(s) appearing in this publication. If the individual may be identifiable, the author(s) has included a statement of release or other written form.

**Keywords:** knee; quadriceps tendon; harvesting quad tendon; ACL reconstruction; ACL tear

## VIDEO TRANSCRIPT

This article describes a standardized, minimally invasive approach for harvesting the quadriceps tendon through a 2 to 3 cm transverse skin incision, presenting it as a viable option.

This procedure is indicated for patients undergoing anterior cruciate ligament (ACL), posterior cruciate ligament, medial collateral ligament, and lateral collateral ligament reconstruction surgery using soft tissue quadriceps grafts.<sup>1,5,7</sup>

The advantages of this technique are long and thick tendon, easy harvesting, small incision, usual harvesting material from ACL reconstruction surgeries, and minimal chance of injuring the infrapatellar branch of the saphenous nerve.<sup>3,5,6</sup>

The disadvantages are aggression to the extensor mechanism, risk of injuring the joint capsule, and should not be used in patients with a history of previous quadriceps surgeries.<sup>2,5</sup>

Complications: 1 potential complication that may arise is the extraction of a short rectus femoris tendon. This

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can occur when we introduce the stripper solely in the proximal direction, without exerting a gentle lateral force, following the longitudinal axis of the femur.

Another possible complication, albeit without significant repercussions, is inadvertently damaging the vastus intermedius during rectus femoris resection. In such cases, we observe joint fluid leakage. This issue can be easily resolved by suturing the injured edges of the rectus femoris.

The patient is positioned in a supine position under anesthesia. The surgery is performed with the knee suspended beside the surgical table.<sup>4,5</sup> We start the procedure by making a transverse incision of 2 to 3 cm on the anterior aspect of the knee, close to the superior pole of the patella. Using a double-bladed No. 15 scalpel handle, an incision is made in the central third of the quadriceps tendon up to 4 to 5 cm in length. The blade is inserted approximately 5 mm deep. If this scalpel handle is not available, a traditional No. 15 blade scalpel may be used instead.

Next, we perform dissection by planes until the vastus intermedius is identified, using a Kelly forceps to dissect the vastus intermedius from the rectus femoris. Then, a transverse incision is made at the superior border of the patella to release the rectus femoris distally.

We then repair the graft with 5-0 Ethibond suture. We introduced the camera inside the incision to observe the direction of the quadriceps fibers, which are proximal and slightly lateral. Mapping out their direction on the skin assists the surgeon in applying force with the stripper in the correct direction.

The graft is then removed with a conventional ACL extractor (closed stripper) size 9. At the moment of introducing the stripper, a constant force should be applied in the longitudinal direction of the femur. To achieve this, we should exert the force discreetly in a lateral direction, with gentle rotational movements. The graft is held with a Kelly forceps, and is inserted until it releases proximally. We observe a long graft removed. The next step is to check for violation of the vastus intermedius and the joint capsule, which generally does not occur. We perform knee flexion-extension to conduct a wide inspection. After confirming this step, we begin approximating the edges of the quadriceps tendon with 3-0 Vicryl in a continuous loop stitch, approximating the edges of the rectus femoris especially in the proximal region of the patella. Our group already treats 20 patients with complete ACL rupture using this technique, 16 male and 4 female. The results

were satisfactory for all patients. We reinforce the importance of applying force in the proximal direction and slightly laterally to avoid the removal of a short rectus femoral graft. We observed another patient with the rectus femoral tendon already sutured.

We then prepare the graft, remove any soft tissue attached to it, and suture the other end with 5-0 Ethibond suture. We then measure its length. The thickness is measured with the graft flexed over itself. We use a double quadriceps graft in our ACL reconstruction technique. We obtained double grafts greater than 10 cm in length in all cases used.

We then performed the suture of the subcutaneous tissue and the skin, and the surgery is finished.

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