

Late Reconstruction of the Patellar Tendon : A New Method of Treatment

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Late reconstruction of severely damaged patellar tendon by transfer of the gracilis tendon, supplemented by a triangular tongue of the quadriceps expansion reflected downwardly was successfully performed in two patients. By using this method, a very strong fascial strip was obtained and there was no need of skeletal traction postoperatively. The two patients treated by this technique returned to their preinjury functional levels. No knee instability was found in both cases.

Loss of the patellar tendon is an uncommon occurrence in civil orthopaedic practice. It can be quite a disabling injury since morbidity of the injured knee can be very great. It can occur after a severely traumatic injury or fracture of the patellar itself, or after superimposed infection. Iatrogenic causes can occur following an operation on the knee in which the insertion of the tendon has been disturbed. If the injury is severe or the initial repair fails and if disruption is not recognised, late reconstruction may be needed to allow the patient to walk bracefree. A new method of treatment has been developed by using the modified Kelikian technique combined with modified Scruderi technique for repairing the quadriceps expansion. It has been used successfully in two cases without complications.

TECHNIQUE

A generous longitudinal midline incision is made over the patella. It begins proximal and lateral to the patella and extends distally, crossing the midline inferior to the patella and ends along the medial flare of the tibia. Flaps are dissected to expose the patella,

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quadriceps and its expansion aponeurosis, tibial tubercle and insertion of the pes anserinus. A towelclip is used to bring the patella down to its original position. (This may be facilitated by inserting a Steinmann pin transversely through the proximal portion of the patella).

The gracilis insertion is then identified and traced back proximally to its musculotendinous junction. Through a separate proximal incision it is divided and brought into the distal part of the first incision. The proximal end is sutured to the companion semitendinosus. Two large drill holes to accommodate the tendon are made, one transversely through the distal third of patella and another obliquely through the tibial tubercle, beginning proximally on the lateral aspect and extended distally to the medial, close to the insertion of gracilis. The free end of the gracilis tendon is passed from the medial to the lateral end of the tibial tuberosity. It is then passed through the hole in the patella from lateral to medial and carried distally and then sutured upon itself.

Next, identify the quadriceps tendon. From the anterior surface of the proximal part of the tendon fashion a triangular flap $3/32$ to $1/8$ inch thick, 3 inches long on each side, and 2 inches wide at the base. Leave the base attached at the proximal pole of the patella, this is the critical part of the technique. The middle part of base of the flap can be dissected downwardly a little. Turn the apex of the triangular

distally and suture it to the tibial tubercle using a reinforcing suture on both sides to the adjacent capsular ligaments, never to the previous gracilis tendon. The gap in quadriceps tendon is then closed with interrupted sutures. Check the stability of the reconstruction, if the repair is not strong enough the Steinmann pin should remain in place and used in conjunction with the cast. Then close the wound in layers with a hemovac drain left insitu. The long leg cast is applied afterwards, holding the knee in extension.

Six weeks postoperatively the cast is removed. If a Steinmann pin is used, it is removed under general anesthesia. A vigorous program of straight leg raising and flexion exercises are then instituted.

CASE REPORTS

CASE 1 : A 9 years old caucasian boy was found with his right leg caught in a grain elevator in August 1977. He was rushed to the University of Missouri Medical Center where debridement was performed. The operative findings were lacerated wounds of the ankle and a severe avulsion over the knee. The skin covering and the whole patellar tendon were com-

pletely destroyed. Postoperatively he was placed in a posterior long leg slab. Because of lack of skin coverage over the knee area, the pedicle rotation skin graft was performed twice, first medially and then laterally. Fortunately no infection occurred and the wound eventually healed. He was sent home in a cylinder leg cast. When the skin was supple enough he returned for further surgery. On December 29, 1977, he underwent operative reconstruction. Because of the instability, a Steinmann pin was used in conjunction with the long leg cast postoperatively. Six weeks later the cast was removed and vigorous physiotherapy was commenced. Another six months later he regained his preinjury functional level and no joint instability was found.

CASE 2 : A 19 year old Thai male was admitted to the hospital following an assault. He sustained many bruises and a stab wound in the left knee. He was initially treated at the local hospital. Seven days postoperatively the wound became infected. The wound was drained twice but the infection persisted. He came to the Siriraj Hospital 3 months later, an extensive debridement was performed and the infection was eventually subsided. Four months later he was brought back for reconstructive surgery. Preoperatively, the ESR was normal

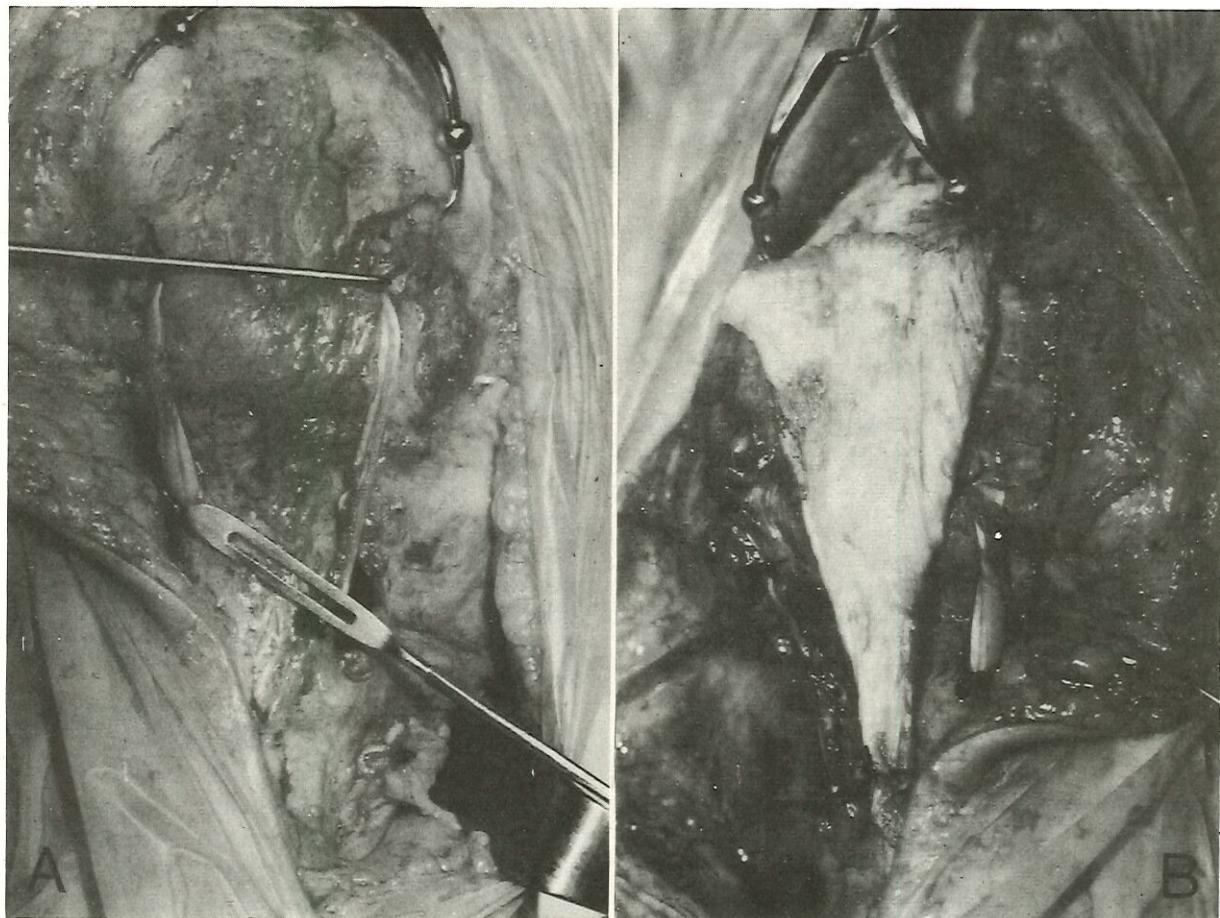


Fig. 1 Case 1 : A. Modified Kelikian technique to restore the patellar tendon.
B. Combined Kelikian technique and Scruderi technique to restore the quadriceps mechanism.

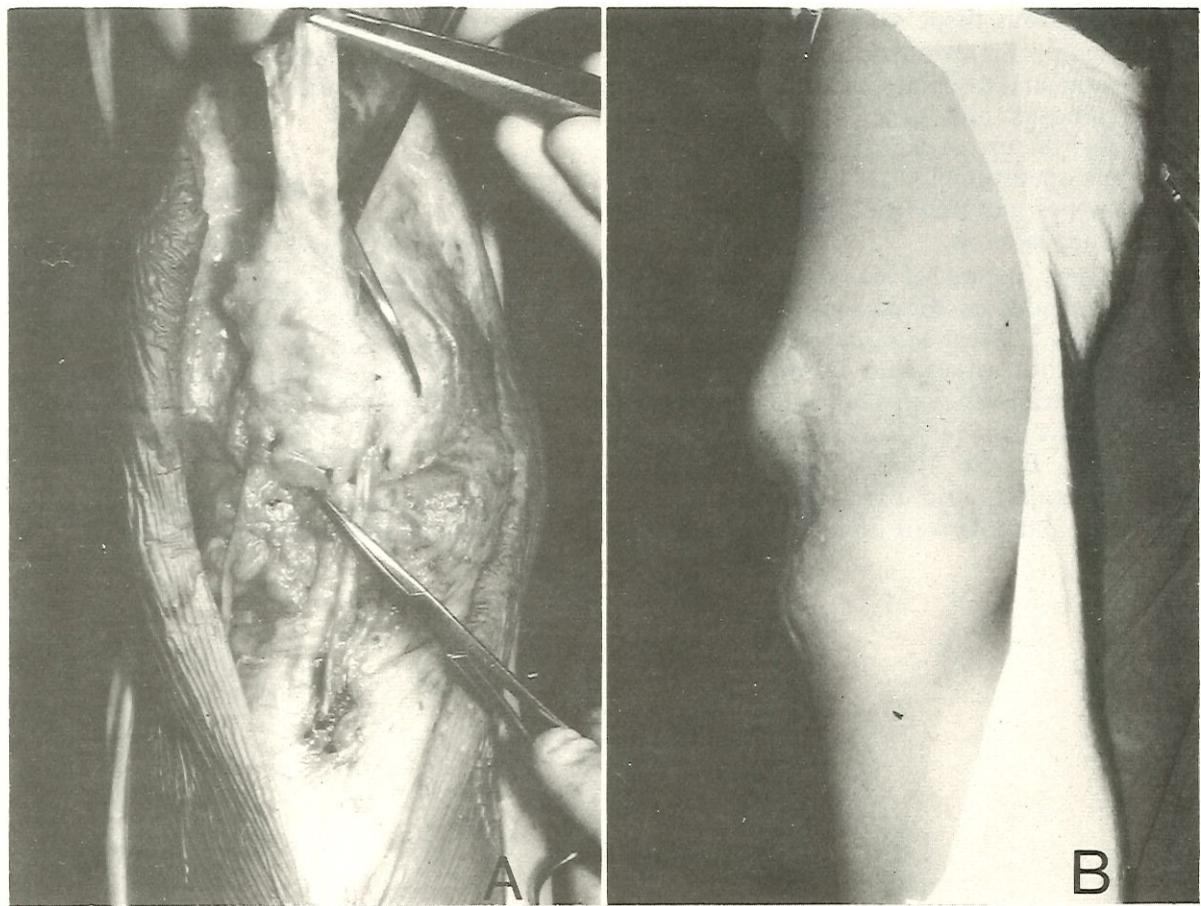


Fig. 2 Case 2 : A. Photograph showing the defect of the patellar tendon preoperatively.
B. After operative repair.

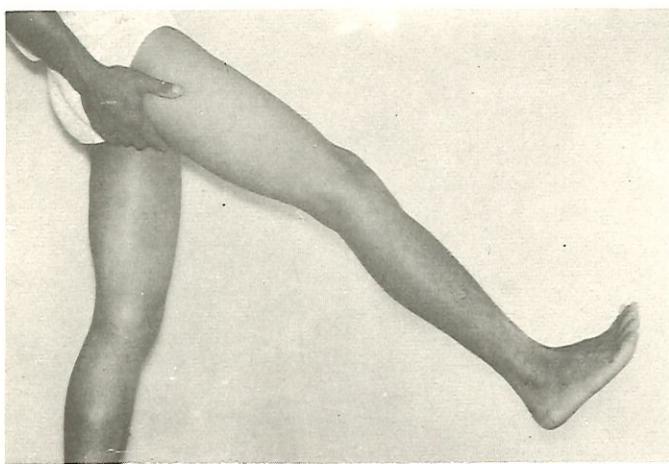


Fig. 3 Case 2 : Photograph showing the knee in extension 6 months postoperatively.

and the skin was supple. Reconstructive surgery was performed without the use of Steinmann pin. During the operation, it was found that the patellar tendon had been completely destroyed, and had been replaced by scar tissue. The knee joint space and internal structure were normal.

Postoperatively, he was placed in a long leg cast for 6 weeks. Then the exercise began. Six months postoperatively, he eventually regained his preinjury functional level, but still had had 1.5 centimeter of thigh atrophy.

DISCUSSION

The complete destruction of the patellar tendon from injury or infection is very rare. There have been no report in English language literature in the past. Only occasionally does a rupture of patellar tendon pass undiagnosed. The reports in literature are of late reconstruction of one or two cases. The biggest serie were four cases taken from Ecker and associates.¹

Many alternative techniques have been reported.

Kelikian and associates used the semitendinosus tendon which the author think it is the most important structure of the pes anserinus. Scruderi³ advocated the use of a triangular flap of the quadriceps tendon to reinforce the repairing of the quadriceps tendon.

Levin⁴ described the use of a Dacron graft to repair and stated that the fibrous tissue invasion of the graft will provide long term strength. But we have to

depend on the fibrous tissue solely and it is impractical in the presence of previous infection, as in the second case. Ecker and associates advocated the use of both semitendinosus and gracilis muscles to gain strength and also the use of a fixation wire loop which needs a second operation for its removal. This will leave the weak pes anserinus to support the medial aspect of the knee later on.

A preliminary period of traction on the patella was also recommended by Kelikian and associates and by Rao and Siwek,⁵ but it was not necessary in these 2 cases. The author agrees with Ecker that a Steinmann pin placed transversly in the patella in conjunction with the cast was very useful to maintain the patellar position. But it is unnecessary if the knee is supple and the scars are not extensive.

Both of the patients were able to return to their

preinjury functional level. In the first case, no gross disturbance was demonstrated even though the initial injury was very severe.

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