



Summary

We present the technique of minimally invasive harvesting of bone patella tendon bone autografts for ligament reconstructions with 2 horizontal incisions. Technical guidelines as well as hints are described. The advantages and disadvantages of the technique are discussed with respect to current literature findings and the authors' experience with several hundreds of those interventions is reflected.

Keywords

Knee– ACL reconstruction– minimally invasive harvest– bone patella tendon bone graft

K.S. Intzoglou et al.

Beschreibung der Operationstechnik zur minimal-invasiven Entnahme des mittleren Patellarsehndrittels für die Kreuzbandrekonstruktion

Zusammenfassung

Die Operationstechnik zur minimal-invasiven Entnahme des mittleren Patellarsehndrittels mittels zwei horizontaler Inzisionen wird im Detail beschrieben. Technische Aspekte sowie Vor- und Nachteile der Technik werden erläutert und in Anbetracht neuerer Literatur zum Thema diskutiert. Die Vorgehensweise trägt dazu bei die Entnahmestellenproblematik in traditioneller offener Technik erheblich zu minimieren und verursacht weder im kurzfristigen noch im Langzeitverlauf Sekundärprobleme.

Schlüsselwörter

Knie– Kreuzband– minimalinvasiv– Patellarsehndrittels– Entnahmestellenproblematik

TECHNICAL PAPER / SPECIAL ISSUE

Minimally invasive harvesting of bone patella tendon bone autografts in anterior cruciate ligament reconstruction: Surgical technique

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Eingegangen/submitted: 07.01.2016; akzeptiert/accepted: 24.02.2016

Online verfügbar seit/Available online: 24.03.2016

Introduction

Approximately 60,000 anterior cruciate ligament (ACL) reconstructions are performed every year in the German-speaking countries. Surgeons mostly use arthroscopic techniques, which are widespread and well-accepted procedures. They provide good results in terms of accuracy and reproducibility of the ACL footprints and apertures of the tunnels.

Although the procedure has evolved from open to all arthroscopic, the autograft harvesting remains "open". Hamstring autografts are more popular among ACL surgeons, mainly because of faster surgery and less postoperative knee pain, but they might come with higher rerupture rates as recently published [4]. Bone-Patella-Tendon-Bone (BPTB) harvesting can be a major cause of postoperative pain and might also have a patella fracture as a side effect. Anterior knee pain has an

incidence postoperatively of 4–60%, when the long "traditional" incision [10] for BPTB harvesting – reaching from the apex of the patella longitudinally to the tibia tubercle – is used. Many sources of postoperative pain have been identified: injury of the infrapatellar branch of the saphenous nerve, tendinopathy, painful scarring, and irritations through the sharp edges of the tibial tuberosity [12]. Given all these, using BPTB as an autograft could regain popularity among surgeons, if postoperative knee pain as a complication could be reduced. Increasing attention is paid to minimally invasive techniques in orthopaedics in general due to better cosmetic results, less postoperative pain and the ability to allow for earlier postoperative motion and rehabilitation [14]. The presented technique serves mainly to reduce anterior knee pain after harvesting BPTB for ACL reconstruction.

Surgical technique

Initial arthroscopy

After having established an ACL deficiency with good preoperative planning and examination under anesthesia we proceed with the arthroscopy, which verifies our initial diagnosis, but mainly establishes concomitant meniscal and chondral lesions. In case of meniscus pathology (i.e. “ramp” lesions) [13], the latter is given priority before ACL reconstruction. For BPTB harvest, both harvest sites should be visualized. With the knee flexed at 90 degrees, two horizontal central incisions of 3 cm long each are made. The proximal incision is at the height of the distal pole of the patella. The distal incision is created at the proximal end of the tibial tuberosity.



Figure 1
The parallel exposures for BPTB harvesting are visible, along with the two arthroscopic portals on either side.

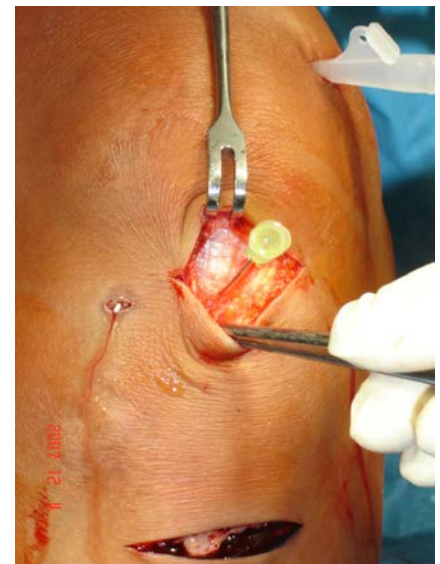


Figure 3
We use a needle in order to mark the central third of the proximal patella tendon and the patella apex.

Harvesting of the patellar bone block

Harvesting the patellar bone block starts the procedure. After horizontal skin incision (Fig. 1), the prepatellar bursa, which is found just under the subcutaneous layer, is incised both horizontally and vertically in a cross-shaped fashion (Fig. 2). The peritendon, which is well identified here, is dissected vertically. The central third of the proximal patella tendon and the patella apex are marked with a needle (Fig. 3). A bone block of 20 mm length and 9–11 mm width is pre-shaped with the use of a ruler. With a sharp no.11 scalpel, the borders of the osteotomies are defined (Fig. 4). With a 10 mm wide oscillating sawblade, harvesting is started with the vertical osteotomies, which have to be oblique (Fig. 5). Having in mind that these two osteotomies need to knit together deeply in order to have a triangular shape of the bone block, the saw is inclined by 45°, leaving a bone block of 9–11 mm thickness.



Figure 2
Harvesting the proximal bone block of our BPTB graft. The scissors are below the peritendon, which is dissected using also a forceps.



Figure 4
The central third of the patella tendon is marked with a scalpel (No. 15). We also mark the boundaries of our osteotomies on the bone blocks.

The osteotomy is finished with a horizontal cut at the proximal part of the bone block, being cautious to incise only the superficial cortical bone. The bone block can now be

harvested with an osteotome and a light mallet (or even no mallet at all). It is better not to hit the patella for harvesting the patella bone block, due to a possible fracture or

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