Technical note

Horizontal posterior hamstring harvest

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ABSTRACT

Harvesting of the gracilis and semi-tendinosus (ST) hamstring tendons is usually performed by anteromedial approach. Harvesting by a horizontal posterior approach is possible. Based on a series of 90 patients, this technical note describes the perioperative difficulties and the characteristics of the harvested tendon(s) as well as any complications. Only one unsuccessful harvest was reported. Posterior harvesting of the gracilis and ST hamstring tendons is a reliable, reproducible surgical technique with a low rate of complications.

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1. Introduction

The hamstring tendons (gracilis and semi-tendinosus [ST]) are frequently used as autografts for anterior cruciate ligament (ACL) reconstruction [1]. Harvesting is traditionally performed by anteromedial approach and is associated with a risk of obtaining grafts that are too short because the tendon is cut at the tendinous cross connections [2,3] and/or with a risk of sensory loss due to injury to the infrapatellar branch of the medial saphenous nerve which can be found in up to 77% of the cases in certain series [4,5].

We propose a single horizontal posterior approach in the popliteal fossa. This posterior approach has been proposed by Prodomos et al. [6] as complementary to the anterior approach.

The goal of this study was to describe the technical characteristics of harvesting, to evaluate the quality of the harvested tendons and the frequency of nerve injury.

2. Surgical technique

The harvesting technique is shown in the attached video (electronic appendix: Video 1). The patient is installed in the supine position with a knee support and a stress post for the thigh on the same side. To easily palpate the hamstrings in the popliteal fossa, the lower limb is raised and the knee is flexed at 20°. External rotation of the foot increases tendon tension. The semi-tendinosus tendon is posterior and lateral to the gracilis (Fig. 1).

The surgeon stands on the inside of the knee and the horizontal 3 to 4 cm incision is made following the creases of the flexed knee along the tendon to be harvested at the popliteal fossa (Fig. 2). The incision is made to the fascia. Once the fascia has been identified, the tendon is isolated with a right-angle clamp. When the right-angle clamp is in place, the fascia is cut to extract the tendon. After placing a piece of gauze around the tendon, it is pulled proximally and distally with the knee flexed at 120°.

Harvesting of the proximal tendon is performed with an open, closable stripper (Fig. 3). As the stripper is advanced towards the

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proximal insertion on the ischiatic tuberosity, continuous countertraction should be exerted on the tendon with a piece of gauze around the tendon. Once the proximal attachment has been freed, the stump is extracted from the incision and the muscle fibers are scraped clean with a pair of Mayo type scissors (Fig. 4).

The distal part of the tendon is harvested with a specific stripper (Fig. 5). This stripper is closed and short to be able to detach the tendon from the tibia with no additional incision (Fig. 6). It is not necessary to free adhesions or tendinous cross connections because of the wide angle between these adhesions and the stripper (Video 1).

3. Results

Between March 2011 and January 2012, 90 consecutive patients underwent ACL reconstruction by an all inside technique [7].
Patients were followed up at postoperative months 1, 2 and 4. The difficulty of the technical maneuver and the quality of the harvested tendon (diameter and length) were evaluated during the procedure. Sensory neuropathy, hypoaesthesia and dysesthesia were investigated by questioning the patient as well as by clinical examination of the skin.

3.1. Graft characteristics and perioperative complications

The mean length of the semi-tendinous tendon was 270 mm (220–330) and the mean diameter after separation into four branches was 8.5 mm (7–11). The graft was harvested without difficulty in 86 cases and was considered to be good quality in 87 cases. We did not have any inadvertent sectioning of the tendon.

There were perioperative difficulties due to posterior harvesting in four patients including one complete failure. This was the first case in the series. Harvesting by anterior approach was then performed.

In two patients both tendons were harvested because of the poor quality of the graft. In one case the gracilis was mistaken for the semi-tendinosus.

4. Discussion

Harvesting of the hamstring tendons for ACL reconstruction results in certain complications that have been described in the literature [8,9].

The use of the posterior approach avoids the difficulties posed by the tendinous cross connections [3]. The single posterior incision is made at a distance from, thus avoiding, the infrapatellar branches of the cutaneous medial saphenous nerve. Nevertheless, neurological injury also occurs during tendon harvesting [10]. Table 1 shows the main results in the literature.

This technique has a low risk of inadvertent sectioning of the graft and no risk of sensory loss.

5. Conclusion

Posterior harvesting of the hamstring tendons is reliable and reproducible and the rate of morbidity is low. Inadvertent sectioning of the tendons is reduced from 8% to 0%. No sensory loss was reported.

Disclosure of interest

R.L., T.P., B.M. declare that they have no conflicts of interest concerning this article.

R.L. Occasional activity as an advisor to Arthrex™.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at do:10.1016/j.otsr.2014.08.002.

References


Table 1

Main complications reported in the literature after ACL reconstruction.

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
<th>No. of patients</th>
<th>Approach</th>
<th>Complication</th>
<th>Rate (%)</th>
<th>Follow-up (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portland et al.</td>
<td>2005</td>
<td>76</td>
<td>Anterior</td>
<td>Sensory injury</td>
<td>50</td>
<td>24</td>
</tr>
<tr>
<td>Prodomos et al.</td>
<td>2005</td>
<td>175</td>
<td>Posterior</td>
<td>Non</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>Papastergiou et al.</td>
<td>2006</td>
<td>226</td>
<td>Anterior</td>
<td>Sensory injury</td>
<td>39.7</td>
<td>12</td>
</tr>
<tr>
<td>Almazán et al.</td>
<td>2006</td>
<td>96</td>
<td>Anterior</td>
<td>Difficulty harvesting</td>
<td>8.3</td>
<td>–</td>
</tr>
<tr>
<td>Luo et al.</td>
<td>2007</td>
<td>60</td>
<td>Anterior</td>
<td>Sensory injury</td>
<td>65.7</td>
<td>14</td>
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<tr>
<td>Sanders et al.</td>
<td>2007</td>
<td>164</td>
<td>Anterior</td>
<td>Sensory injury</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>Kjaergaard et al.</td>
<td>2008</td>
<td>50</td>
<td>Anterior</td>
<td>Sensory injury</td>
<td>41</td>
<td>12</td>
</tr>
<tr>
<td>Gaudot et al.</td>
<td>2008</td>
<td>122</td>
<td>Anterior</td>
<td>Sensory injury</td>
<td>32</td>
<td>26</td>
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