Infrapatellar fat pad affects the anterior knee pain at 6 months after the anterior cruciate ligament reconstruction with a hamstring autograft

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I have no financial conflicts to disclose
**Anterior Knee pain (AKP)** is a frequent complication after anterior cruciate ligament reconstruction (ACLR)

**Risk factors**

- Older age
- Higher body mass index (BMI)
- Increased blood flow in the infrapatellar fat pad (IPFP)

**IPFP**

IPFP is one of the four fat pads around the knee

An intra-capsular, extrasynovial structure covered posteriorly by the synovial membrane
Introduction

After ACLR, the thickness change ratio of the superficial IPFP during knee flexion is lower than unaffected side.

Inflammatory role by secreting cytokines

Our hypothesis

The lower change ratio of IPFP may affect AKP after ACLR.
To evaluate whether the **dynamic change** in IPFP affects AKP at 6 months after ACLR with a hamstring autograft
Materials & Methods

**Subjects**
Between 2016 and 2017

42 patients (19 males and 23 females, mean age; 23.0±10.0 years)

**Inclusion criteria**
- Patients who underwent primary anatomical single-bundle ACLR with a hamstring autograft at our institution
- Full range of motion on knee joint

**Evaluation**
At 6 months after ACLR

- The thickness of the IPFP at 10° and 90° knee flexion
- The thickness change ratio of the superficial part of IPFP
- The degree of increased blood flow in the IPFP

These were evaluated by ultrasonography

- AKP was assessed by using Kujala score [6]
**Materials & Methods**

**Ultrasound assessment**

- Longitudinal ultrasonographic images were recorded at the center of the patellar tendon, along the tendon fiber, to analyze the IPFP and patellar apex.

- The superficial part of IPFP was defined as the low-echo intensity area of the IPFP.
The mean thickness change rate of the IPFP was calculated as the thickness at 90° knee flexion divided by that at 10° knee flexion.

- **Materials & Methods**

  **Ultrasound assessment**

  - The thickness of the superficial part of IPFP at 10° and 90° knee flexion was measured by Image J.
**Materials & Methods**

**Ultrasound assessment**
- Color Doppler was used to detect blood flow in the IPFP according to a previous study [7].
  - Grade 0: no flow in the IPFP
  - Grade 1: single vessel signals
  - Grade 2: confluent vessel signals in less than half of the whole area of the IPFP
  - Grade 3: vessel signals in more than half of the whole area of the IPFP

**Statistical analysis**
- The correlation between the Kujala score and IPFP was examined using the Spearman’s rank-correlation coefficient (the p value of <0.05 was considered statistically significant).
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value (mean±SD)</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>23.0±10.0</td>
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<td>BMI (kg/m²)</td>
<td>21.7±3.3</td>
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<tr>
<td>The thickness of IPFP at 90° knee flexion (mm)</td>
<td>10.4±5.0</td>
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<tr>
<td>The thickness of IPFP at 10° knee flexion (mm)</td>
<td>5.5±3.2</td>
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<tr>
<td>IPFP thickness change ratio of IPFP (%)</td>
<td>211.0±83.5</td>
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<tr>
<td>The grade of IPFP blood flow (grade 0/1/2/3)</td>
<td>25/11/6/0</td>
</tr>
<tr>
<td>Kujala score</td>
<td>88.8±9.5</td>
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</tbody>
</table>
Spearman’s rank correlation coefficient

The thickness change rate of the IPFP (%): \(211 \pm 84\%\)

Kujala score: \(88.8 \pm 9.5\)

\(r_s = 0.728^{**}\)

\(* *: p < 0.01\)
There were significant correlations between AKP and the thickness change ratio of IPFP, the grade of IPFP blood flow, age, and BMI.

<table>
<thead>
<tr>
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<th>Kujala score</th>
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<tr>
<td>The grade of IPFP blood flow (grade 0/1/2/3)</td>
<td>-0.420**</td>
</tr>
<tr>
<td>Age</td>
<td>-0.683*</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.371*</td>
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**: p<0.01  *: p<0.05
【Conclusion】

The kujala score and thickness change ratio of the superficial area of the IPFP significantly correlated at 6 months after primary anatomical single-bundle ACL reconstruction with hamstring autograft.

【References】