Investigation of the factors to affect the duration to return sports after the surgery of anterior talofibular ligament repair with arthroscopy

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I have no financial conflicts to disclose.
**Background**

An ankle sprain is a common trauma in orthopedic practice, which involves the ankle lateral ligament complex injuries [1,2]. The anterior talofibular ligament (ATFL) and the calcaneofibular ligament (CFL) are damaged in severe ankle sprains.

In 5%-20% of patients with ankle sprains, **chronic lateral ankle instability (CLAI)** remains despite adequate conservative treatment [3,4].

Recently, the **Broström** [5] procedures with arthroscopy have been developed, which showed good clinical outcomes [6-10].

**Gould** reported the augmentation method with the inferior extensor retinaculum [11].

In our hospital, we also perform arthroscopic treatment to patients with symptoms of CLAI.

**The purpose of this study** was to examine the factors influencing postoperative clinical outcomes of arthroscopic repair surgery of ATFL for CLAI.
Materials and methods

Inclusion criteria
- From January 2016 to December 2017
- Patients initially underwent conservative treatments for 3 or more months. (immobilization, orthosis, bandage, and rehabilitation)
- Then, patients underwent arthroscopic surgery for CLAI
- Follow-up for one year after surgery

Exclusion criteria
- Fractures
- Osteoarthritis
- Previous history of surgical treatment of the ankle

Ten patients (4 men, 6 women) with a mean age of 32 years (range, 14-60 years) were analyzed in this study.
Clinical and radiographic assessment

Patients

- pain or tenderness on the lateral side of the ankle
- positive anterior drawer test finding
- radiography under varus and anterior drawer stress with the Telos Stress Device (Aimedic MMT, Japan)

Diagnosis of CLAI

- a talar tilt angle (TTA) of >2°
- a talar anterior drawer distance (TAD) of >5 mm compared with the contralateral side

Clinical evaluation with the Japanese Society for Surgery of the Foot (JSSF) ankle-hindfoot scale [12,13].

All patients underwent clinical and radiographic examinations before surgery and one year after surgery.
Surgical techniques

1. Arthroscopic examination was performed first.
   articular cartilage injury \(\Rightarrow\) debridement and micro-fracture

2. Arthroscopic Broström
   one anchor, which was placed between the center and the superior side of the fibular footprint of the ATFL.

3. The Gould augmentation
   subcutaneously, with the other anchor introduced to the proximal aspect of the first anchor

ATFL repair were was performed according to the techniques described by Matsui et al. [20]
Postoperative procedures

- External fixation with a plaster slab
- Non-weight-bearing gait for two weeks after surgery

Articular cartilage injury

- No.
- Range of motion exercises and weight-bearing gait at 3 weeks postoperatively

- Yes.
- Range of motion exercises at 3 weeks, weight-bearing gait at 5 weeks postoperatively
### Results

<table>
<thead>
<tr>
<th></th>
<th>preoperative</th>
<th>postoperative</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TTA</strong></td>
<td>7.4° ± 3.8°</td>
<td>3.4° ± 1.8°</td>
<td>0.017</td>
</tr>
<tr>
<td><strong>TAD</strong></td>
<td>6.4 mm ± 1.5 mm</td>
<td>4.0 mm ± 1.3 mm</td>
<td>0.0040</td>
</tr>
<tr>
<td><strong>JSSF scale</strong></td>
<td>60.8 pts ± 13.6 pts</td>
<td>89.6 pts ± 1.1 pts</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The mean time when patients could start jogging postoperatively was 3.5 months (SD, 1.8 months).
## Results

**Comparison between patients with and without cartilage damage**

<table>
<thead>
<tr>
<th></th>
<th>Patients without cartilage damage</th>
<th>Patients with cartilage damage</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (male/female)</td>
<td>3/2</td>
<td>2/3</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>35 (18–44)</td>
<td>26 (14–60)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Body height (cm)</td>
<td>170 (140–170)</td>
<td>166 (154–180)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Body weight (kg)</td>
<td>60 (50–83)</td>
<td>71 (53–85)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Preoperative TTA (°)</td>
<td>9 (5–14)</td>
<td>6 (3–8)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Preoperative TAD (mm)</td>
<td>6.5 (5.0–7.0)</td>
<td>6.5 (4.5–8.5)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Preoperative JSSF scale (pt)</td>
<td>66 (62–69)</td>
<td>66 (28–69)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Postoperative TTA (°)</td>
<td>3 (1–5)</td>
<td>5 (0–6)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Postoperative TAD (mm)</td>
<td>3.0 (1.0–5.0)</td>
<td>5.0 (0.0–6.0)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Postoperative JSSF scale (pt)</td>
<td>90 (87–90)</td>
<td>90 (87–90)</td>
<td>n.s.</td>
</tr>
<tr>
<td>start jogging (month)</td>
<td>2 (1–3)</td>
<td>6 (3–6)</td>
<td>0.032 *</td>
</tr>
<tr>
<td>return to sports (month)</td>
<td>4 (2–4)</td>
<td>6 (4–7) †</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

†: the value including three patients who could return to sports within one year after surgery.
**Discussion**

The results of this study described that the clinical outcome of ATFL repair surgery using the arthroscopic procedure was good, but it was affected by cartilage damage.

In this study, the postoperative time to start jogging in patients with cartilage damage was obviously delayed compared to that of patients without cartilage damage, even considering the postoperative course that the time to non-weight bearing gait was delayed for 2 weeks.

Furthermore, there were 2 patients who could not return to pre-injury sports activity level within one year after surgery.
**Discussion**

We consider that

- cartilage damage associated with CLAI is an important factor to delay the start of activities.

- arthroscopic examination of cartilage damage is considered meaningful for postoperative predictor of the time to start jogging and return to sports.

**Conclusion**

The clinical outcome after arthroscopic repair of ATFL for CLAI was good.

The postoperative time to start jogging and to return to sports was delayed in patients with cartilage damage.
References


