



Unique patellofemoral alignment in a patient with a symptomatic bipartite patella



Masakazu Ishikawa^{a,*}, Nobuo Adachi^a, Masataka Deie^b, Atsuo Nakamae^a, Tomoyuki Nakasa^a, Goki Kamei^a, Kobun Takazawa^a, Mitsuo Ochi^a

^a Department of Orthopaedic Surgery, Graduate School of Biomedical & Health Sciences, Hiroshima University, Hiroshima, Japan

^b Laboratory of Musculoskeletal Functional Research and Regeneration, Graduate School of Biomedical & Health Sciences, Hiroshima University, Hiroshima, Japan

ARTICLE INFO

Article history:

Received 28 December 2014

Received in revised form 21 March 2015

Accepted 15 April 2015

Keywords:

Symptomatic bipartite patella

Patellofemoral alignment

Vastus lateralis release

ABSTRACT

Background: A symptomatic bipartite patella is rarely seen in athletic adolescents or young adults in daily clinical practice. To date, only a limited number of studies have focused on patellofemoral alignment. The current study revealed a unique patellofemoral alignment in a patient with a symptomatic bipartite patella.

Methods: Twelve patients with 12 symptomatic bipartite patellae who underwent arthroscopic vastus lateralis release (VLR) were investigated (10 males and two females, age: 15.7 ± 4.4 years). The radiographic data of contralateral intact and affected knees were reviewed retrospectively. From the lateral- and skyline-view imaging, the following parameters were measured: the congruence angle (CA), the lateral patellofemoral angle (LPA), and the Caton–Deschamps index (CDI). As an additional parameter, the bipartite fragment angle (BFA) was evaluated against the main part of the patella in the skyline view.

Results: Compared with the contralateral side, the affected patellae were significantly medialized and laterally tilted (CA: $P = 0.019$; LPA: $P = 0.016$), although there was no significant difference in CDI ($P = 0.877$). This patellar malalignment was found to significantly change after VLR (CA: $P = 0.001$; LPA: $P = 0.003$) and the patellar height was significantly lower than in the preoperative condition ($P = 0.016$). In addition, the BFA significantly shifted to a higher degree after operation ($P = 0.001$).

Conclusions: Patients with symptomatic bipartite patellae presented significantly medialized and laterally tilted patellae compared with the contralateral intact side. This malalignment was corrected by VLR, and the alignment of the bipartite fragment was also significantly changed.

Level of evidence: Level IV, case series

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

A bipartite patella is considered a developmental variation of ossification. It is estimated to occur as an asymptomatic, incidental finding in 0.2 to six percent of adults [1–3]. The bipartite patella is rarely symptomatic (two percent of cases) in juvenile and young adults, resulting in anterior knee pain associated with sports activities [4,5]. Trauma, excessive traction force, vascular insufficiency, or a combination of these conditions has been considered as causes of the symptomatic form [6,7]. In practical settings, patients receive conservative treatment, such as rest, a quadriceps rehabilitation program, and modification of the patient's activity. However, for patients who fail conservative management, surgical intervention should be considered.

To date, excision of the accessory bone has been a common surgical procedure with good clinical results [7]. In this respect, Batten and Menelaus stated that fragment separation might be a further form of traction osteochondritis in the mechanism of quadriceps attachment [8]. According to this concept, several procedures for correcting this traction force with an extensor mechanism have been attempted. In 1994, Ogata reported that patients with bipartite patellae were treated by minimally detaching the vastus lateralis muscle inserted into the patellar fragment left in situ, achieving bone union and preserving quadriceps strength [9]. Mori et al. suggested that the sustained traction acting on the patella laterally and proximally causes the pain and this pathophysiological condition [10]. They demonstrated that modified lateral release resulted in bony union on radiographs within four months in 11 of 16 knees. Inspired by this report, Ochi et al. hypothesized that arthroscopic vastus lateralis release (VLR) of the fragment alone could sufficiently reduce the traction force without performing an invasive lateral retinacular release or excising the fragment. This minimally invasive arthroscopic procedure accelerated pain relief and bony union without any major complication, compared with open excision of the accessory bone [11].

* Corresponding author at: Department of Orthopaedic Surgery, Graduate School of Biomedical & Health Sciences, Hiroshima University, 1-2-3 Kasumi, Minami-ku, Hiroshima 734-8551, Japan. Tel.: +81 82 257 5233; fax: +81 82 257 5234.

E-mail address: mishikawa@hiroshima-u.ac.jp (M. Ishikawa).

Based on these clinical outcomes, reduction of the traction force on the accessory bone is a critical part of treatment for this disorder; however, the pathophysiology and anatomical features of a symptomatic bipartite patella have not been investigated. Of note, patellofemoral malalignment in anterior knee pain syndrome has been investigated with various modalities, such as skyline-view imaging, computed tomography (CT), and magnetic resonance imaging (MRI). Few reports present the radiographic alignment of the patellofemoral joint in a symptomatic bipartite patella [12,13].

Therefore, in the current study, the patellofemoral alignment was evaluated using conventional radiographic measurement methods in comparison with the contralateral intact knee. The alignment change before and after arthroscopic VLR was evaluated to reveal the effect of the surgical procedure on the anatomical features of a symptomatic bipartite patella.

2. Methods

2.1. Patients

Patients who underwent arthroscopic VLR due to a symptomatic bipartite patella from August 2005 to December 2013 were retrospectively reviewed. Patients meeting the following criteria were included in the study: (1) unilateral symptomatic bipartite patella and (2) no symptom in the contralateral knee. Patients with bilateral asymptomatic or symptomatic bipartite patellae and any symptom of other disorders such as Osgood–Schlatter disease or osteochondritis dissecans were excluded. From this review, a total of 16 patients were seen. Two of these patients were excluded because of bilateral symptomatic bipartite patellae. We identified 12 patients with 12 unilateral symptomatic bipartite patellae who had failed to respond to conservative treatment for at least three months. Before surgery, these 12 patients were prescribed sports activities adapted according to pain level, stretching exercises for the quadriceps muscle, and anti-inflammatory medications. None of the patients declined surgery. The patient demographic information is summarized in Table 1. Ten males and two females with an average age of 15.7 ± 4.4 years (range, 12–28) at the time of surgery were recruited to this study. All patients participated in sports activities and complained of a superior-lateral pain in the knee during or after sports activities. No patient had any apparent traumatic episode triggering pain. Localized tenderness over the superolateral portion of the patella was reported. According to Saupé's classification, the patellae were classified as type III in all patients [1]. The mean follow-up period was 5.9 ± 2.9 months.

2.2. Operative technique

A routine arthroscopic examination was performed via the lateral and medial infrapatellar portals using a 30° oblique arthroscope. Instability and the presence of articular cartilage damage in the bipartite fragment were examined by careful probing. Next, under a fluoroscopic

view, the proximal and distal edges of the bipartite fragment were marked with 23-gauge needles percutaneously by trephination, as reported in our previous study [11]. Using this needle guide, only the attachment of the vastus lateralis to the bipartite fragment was released. An electric scalpel (LIGAMENT CHISEL Probe, Hook, Smith & Nephew) was used for release as well as for cauterizing bleeding vessels from the released edge (Fig. 1).

2.3. Postoperative rehabilitation

Immediately after the operation, all patients were allowed to perform active quadriceps exercises. After the knee was immobilized with a brace in the 20°-flexed position for two days, patients then performed range-of-motion exercises using a continuous passive motion device. One week after the operation, weight bearing was allowed. Running was allowed three to four weeks after the operation. Return to sports activities was usually allowed two months after the operation if the patient had no pain or discomfort.

2.4. Clinical evaluation

The clinical results were graded according to Ogata's criteria as excellent (no symptoms with strenuous activities), good (marked improvement with occasional, minimal pain), fair (some improvement), or poor (no improvement) [9].

2.5. Radiographic evaluation

The patellofemoral alignment in the symptomatic bipartite patella of each patient was evaluated from the radiographs of the bilateral knee (anteroposterior, lateral, and skyline views) taken at the initial office visit by measuring the radiographic values for the patellofemoral indices described later. Based on the exclusion criteria, the contralateral side with no bipartite fragment and symptom was considered as the intact knee. The skyline view was obtained at 45° knee flexion. The radiographs taken at the final office visit were evaluated as the postoperative condition compared with the preoperative affected side.

2.5.1. Congruence angle

The congruence angle (CA) was measured as an indicator of patellar centralization and subluxation. Following the method described by Merchant et al., the sulcus angle was bisected to establish a reference line and then a second line was projected from the apex of the sulcus to the lowest point on the articular ridge of the patella. When this line was lateral to the reference line, the angle was given a positive value; when medial, a negative value was assigned (normal range: -6° to $+16^\circ$) [14,15] (Fig. 2A).

2.5.2. Lateral patellofemoral angle

To assess the patellar tilt, the lateral patellofemoral angle (LPA) was measured. The skyline view of patients with affected and intact knees

Table 1
Demographic data of 12 patients.

Case #	Age at onset	Gender	Side	Saupé's classification	Sports activity	Follow-up (months)	Bone union	Clinical results
1	15	M	R	III	Basketball	9	+	Excellent
2	15	M	L	III	Soccer	7.5	+	Excellent
3	18	M	L	III	Baseball	8	+	Excellent
4	12	M	R	III	Baseball	6	+	Excellent
5	12	M	R	III	Baseball	12	+	Excellent
6	28	M	R	III	Not specified	4	–	Excellent
7	18	M	L	III	Soccer	4	–	Good
8	15	M	R	III	Baseball	7	+	Excellent
9	13	M	L	III	Baseball	1.5	–	Excellent
10	13	F	R	III	Volleyball	7	+	Excellent
11	13	F	R	III	Karate	6	+	Excellent
12	16	M	L	III	Baseball	3	–	Good

Download English Version:

<https://daneshyari.com/en/article/4077203>

Download Persian Version:

<https://daneshyari.com/article/4077203>

[Daneshyari.com](https://daneshyari.com)