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Refractory patellar tendinopathy treated by arthroscopic decortication of the inferior patellar pole in athletes: Mid-term outcomes

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ABSTRACT

Background: This study aimed to evaluate the clinical outcomes of arthroscopic decortication of the inferior patellar pole in athletes with refractory chronic patellar tendinopathy.

Methods: Thirty-seven athletes in whom conservative management for at least six months failed underwent arthroscopic patellar tendon debridement and decortication of the inferior pole of the patella. Clinical outcomes were evaluated using subjective knee scores and isokinetic muscle strength tests. The average duration taken and sports participation level were also assessed.

Results: The mean follow-up period was 51.3 ± 14.8 months. At the last follow-up, all improvements in subjective knee scores including Lysholm score, International Knee Documentation Committee (IKDC) subjective score, Victorian Institute of Sport Assessment -Patella (VISA-P) score, and Kujala score were statistically significant ($p < .001$). Tegner activity scale improved from 6.5 ± 1.0 to 8.9 ± 0.8 ($p < .001$). Limb symmetry index for extensor peak torque improved from 71.4 ± 19.6% to 92.7 ± 21.7% ($p < .001$). Thirty-two (86.5 %) athletes were able to return to full sports activities in a mean 3.5 ± 1.7 months, and 27 (73%) athletes maintained their previous sports activity level at the last follow-up. Symptoms recurred in two (5.2%).

Conclusions: Arthroscopic decortication of the inferior pole of the patella showed satisfactory clinical results and high rates of return to sports at mid-term follow-up in professional athletes with refractory chronic patellar tendinopathy. This technique could be an invasive, safe, and effective treatment for chronic patellar tendinopathy in professional athletes who want a faster return to sports.

Level of evidence: Level IV, case series.

1. Introduction

Patellar tendinopathy, also known as “jumper's knee,” commonly occurs in athletes who participate in high-intensity jumping sports like volleyball and basketball [1–3]. The overall career prevalence of jumper's knee in athletes is around 14%, with that in some sports such as volleyball being as high as 40–50% [2]. Repetitive stress of the extensor mechanism in sports such as soccer can result in the development of patellar tendinopathy [4]. The natural history of this disease is chronic and recurring pain with reduced function, which can severely limit or even end an athletic career [1,2,5]. Thus, it is important to recognize interventions that allow an early return to sports [1,2,6–8].

The main pathologic feature of patellar tendinopathy is degeneration of the tendon tissue, and tendinosis usually occurs in the proximal and posterior portion of the patellar tendon adjacent to the inferior patellar pole [9–12]. Factors linked to pain are the

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presence of focal synovitis around the inferior patellar pole and hypertrophy of the fat pad [1,13,14]. Histological findings include mucoid and collagen disorganization, hypercellularity, neovascularization, pseudocysts at the bone–tendon interface, and an increased sympathetic response [15,16].

Conservative management remains the treatment of choice for this disease [12,14,17]. Conservative treatment options are varied and include rest, nonsteroidal anti-inflammatory drugs, eccentric exercises, platelet-rich plasma (PRP) injection, sclerosing injection with a chemical irritant, and extracorporeal shock wave therapy (ESWT) [6,7,18–20]. Although non-operative treatments often improve pain and function, a large proportion of athletes require operative treatment due to prolonged symptom duration and their inability to maintain their desired activity level [8,12,13]. The goals of operative treatments are the excision of degenerated tissue and the stimulation of the healing process of the patellar tendon and the inferior pole of the patella [12]. Open procedures vary from tenotomy or partial release of the patellar tendon to drilling of the inferior pole of the patella to resection of the patellar inferior pole [12,21–23]. Arthroscopic surgery involves a soft-tissue procedure alone, including removal of the synovium and fat pad and debridement of the patellar tendon, [24,25] or a soft-tissue procedure with an additional bony procedure such as resection or osteoplasty of the patellar inferior pole [10,16,26,27]. A recent review article proved that open and arthroscopic treatments were comparable and that arthroscopic surgery resulted in a faster return to sports [8,12]. However, there is no consensus on the best surgical treatment option for chronic patellar tendinopathy. We prefer to use arthroscopic treatment, which is safe and minimally invasive and can provide a faster recovery [8]. Hence, we used arthroscopic decortication of the inferior pole of the patella including the enthesis combined with debridement of the patellar tendon, especially in high-level athletes. We assumed that bleeding from the decorticated bone could stimulate the autologous biological factors and provide high healing potential over the attachment of the patellar tendon [28].

The purpose of the present study was to evaluate the mid-term efficacy of arthroscopic decortication of the inferior pole of the patella in high-level athletes with refractory chronic patellar tendinopathy. We hypothesized that this arthroscopic technique would show satisfactory clinical outcomes and early resumption of professional duties and that it could be maintained at the last follow-up.

2. Material and methods

2.1. Patient selection

Forty-two professional athletes with refractory chronic patellar tendinopathy who underwent arthroscopic decortication of the inferior pole of the patella between March 2010 and December 2013 were enrolled. This study was performed with the approval of the ethics committee of KonKuk University Medical Center (KUH1060158). Arthroscopic surgery indications were: (1) definite local tenderness at the inferior patellar pole that was relieved by or disappeared with knee flexion of up to 90°; (2) magnetic resonance imaging (MRI) with evidence of patellar tendinopathy at the proximal and posterior portion (Figure 1); (3) persistent symptoms aggravated during landing, stop-turning movements, walking downstairs, and long running despite a minimum of six months of nonoperative treatments including PRP injection and ESWT; and (4) desire to return to their previous sports activity levels as soon as possible. Recreational-level sports participants were not included as an indication of operative treatments. Exclusion criteria were: (1) previous surgery of the affected knee; (2) concomitant pathological conditions such as patellofemoral malalignment, cartilage lesions over grade 1 according to the International Cartilage Repair Society, meniscal tears, and cruciate ligament injuries. Finally, 37 athletes were included (Table 1). The mean patient age was 20.3 years (range, 16–25 years) and the male:female ratio was 32:5. All showed failure of previous conservative treatment including quadriceps eccentric exercise, PRP injections, and ESWT targeting the tendinopathy for a mean treatment period of 8.4 months (range, six to 17 months). Preoperative patellofemoral joint axis was evaluated using congruence angle, Insall-Salvati ratio, and Q-angle. The mean value of congruence angle, Insall-Salvati ratio, and Q-angle was $-2.5 \pm 0.7°$, 0.9 ± 0.5, and $9.7 \pm 2.8°$.

2.2. Surgical technique

All procedures were performed by an experienced senior surgeon (J.G.K.). A tourniquet was placed, with each patient in a supine position. Diagnostic arthroscopy was performed using the standard anteromedial (AM), anterolateral (AL), and superolateral (SL) portals. The knee was kept extended with the arthroscope in one of the anterior (AM or AL) portals and the desired instrumentation was introduced through the other corresponding portal. Focal synovectomy was performed using a shaver and an electrocautery device (ArthroCare; Smith and Nephew, Austin, TX, USA) around the inferior patellar pole and the proximal and posterior tendon portion. Once the extra-articular part of the inferior patellar pole that was covered by the patellar tendon enthesis (bone–tendon interface) was clearly visualized, two 18-G needles were inserted to coronally extend the lesion estimated using preoperative MRI (Figure 2). Thorough debridement of the pathologic patellar tendon and the paratenon was performed along with the excision of any hypertrophic Hoffa's fat pad with a shaver, within the zone of the needles. To facilitate the exposure of the extra-articular part and reduce the time required for the procedure, the curette and electrocautery device (ArthroCare) were generously used (Figure 3). A 3.5-mm arthroscopic burr was then introduced through the AM or AL portal and the patellar tendon insertion including the enthesis was decorticated until the cancellous bone was exposed (Figure 3). The tourniquet was then deflated; once active bleeding from the bone was confirmed arthroscopically, the procedure was deemed complete (Figure 4).

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