


Mid-term outcomes of Osgood-Schlatter patients undergoing arthroscopic excision

Artroskopik eksizyon uygulanan Osgood-Schlatter hastalarının orta dönem sonuçları

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ABSTARCT

Aim: If surgical intervention is necessary for Osgood-Schlatter patients, a number of surgical techniques including open surgical, arthroscopic and bursoscopic procedures are available. The aim of this study was to evaluate the mid-term clinical results of patients who underwent arthroscopic excision with the diagnosis of OSD.

Materials and Methods: This study was modeled with a retrospective design. 16 patients who underwent arthroscopic ossicle excision were included in this study. The Visual Analog Scale (VAS) Score, Tegner Activity Scale and Lysholm Knee Score forms were administered to the patients in order to compare their pre-operative and post-operative condition. In addition, complications such as infection, residual bone fragments, re-hospitalization or recurrence were evaluated and recorded.

Results: A total of 16 patients were included in the study, and of these patients, 11 (68.75%) were male and 5 (31.25%) were female. The mean age of the patients is 28.8 (20–41 ± 7) years. The mean follow-up period was 82.9 (61–108 ± 15) months. The mean time for return to sports-related training activities for all of the patients was 9.2 (8–11) weeks. The mean VAS decreased from 6.8 ± 1.1 points preoperatively, to 5.7 ± 1.3 at the final follow-up ($P < 0.001$). In addition, the mean Tegner Activity Level score improved from 5.7 ± 0.6 preoperatively to 7.8 ± 0.9 at the final follow-up ($P < 0.001$). The mean Lysholm Knee Scale score was 77.4 ± 4.6 points in the preoperative period, increasing to 97.7 ± 5.8 points at the final follow-up ($P < 0.001$). In one patient, recurrence occurred at the 105th postoperative month and revision surgery was performed.

Conclusion: Arthroscopic ossicle excision for OSD can be considered an adequate technique when the mid-term results are evaluated. Although rare, recurrence may occur after arthroscopic surgery. In order to demonstrate the superiority of the arthroscopic method over open surgical procedures, comparative studies containing long-term results are required.

Keywords: Osgood-Schlatter, knee, arthroscopy, arthroscopic excision.

ÖZ

Amaç: Osgood-Schlatter hastalarında cerrahi müdahale gerekiyorsa açık cerrahi, artroskopik ve bursoskopik işlemler de dahil olmak üzere çok sayıda cerrahi teknik mevcuttur. Bu çalışmanın amacı Osgood-Schlatter tanısıyla artroskopik eksizyon uygulanan hastaların orta dönem klinik sonuçlarını değerlendirmektir.

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Application date: 05.06.2024 Accepted: 19.07.2024

Gereç ve Yöntem: Bu çalışma retrospektif olarak modellenmiştir. Artroskopik kemikçik eksizyonu yapılan 16 hasta çalışmaya dahil edilmiştir. Hastaların ameliyat öncesi ve ameliyat sonrası durumlarını karşılaştırmak amacıyla Görsel Analog Skala (VAS) Skoru, Tegner Aktivite Skalası ve Lysholm Diz Skoru formları uygulanmıştır. Ayrıca enfeksiyon, kalıntı kemik parçaları, yeniden hastaneye yatış veya nüks gibi komplikasyonlar da değerlendirilerek kaydedildi.

Bulgular: Çalışmaya toplam 16 hasta dahil edildi ve bu hastaların 11'i (%68,75) erkek, 5'i (%31,25) kadındı. Hastaların ortalama yaşı 28,8 (20-41±7) yılıdır. Ortalama takip süresi 82,9 (61-108 ± 15) aydır. Tüm hastaların sporla ilgili antrenman faaliyetlerine dönüş süresi ortalama 9,2 (8-11) haftaydı. Ortalama VAS ameliyat öncesi 6,8 ± 1,1 puandan son takipte 5,7 ± 1,3'e düştü ($p<0,001$). Ek olarak, ortalama Tegner Aktivite Düzeyi skoru ameliyat öncesi 5,7 ± 0,6'dan son takipte 7,8 ± 0,9'a yükseldi ($p<0,001$). Ortalama Lysholm Diz Skalası skoru ameliyat öncesi dönemde 77,4 ± 4,6 puan iken, son takipte 97,7 ± 5,8 puana yükseldi ($p<0,001$). Bir hastada postoperatif 105. ayda nüks gelişti ve revizyon ameliyatı uygulandı.

Sonuç: Osgood-Schlatter hastalığı için artroskopik kemikçik eksizyonu, orta dönem sonuçları değerlendirildiğinde yeterli bir teknik olarak düşünülebilir. Artroskopik cerrahi sonrası nadir de olsa nüks meydana gelebilir. Artroskopik yöntemin açık cerrahi işlemlere üstünlüğünü ortaya koymak amacıyla uzun dönemli karşılaştırmalı çalışmalar yapılabilir.

Anahtar Sözcükler: Osgood-Schlatter, diz, artroskopi, artroskopik eksizyon.

INTRODUCTION

Osgood-Schlatter disease (OSD) is a traction apophysitis of the tibial insertion of the patellar tendon (1). It occurs as a result of repeated mechanical strain of the quadriceps femoris muscle on the tibial tubercle. OSD is manifested by painful inflammation at the point of attachment of the patellar tendon on the tibial tubercle (2). OSD patients are mostly asymptomatic, but roughly 25% of patients experience pain that occurs especially during and after physical activity and swelling around the tibial tubercle (3, 4). The aforementioned symptoms most often occur in males between the ages of 10–15, and in females between the ages of 8–13 (5). Although symptoms improve in most patients after the completion of skeletal maturation, these symptoms may persist and/or appear in a number of patients (6, 7).

Conservative therapy is carried out as the first step when symptoms appear. Conservative therapy for OSD consists of cold application, immobilization, rest, and adjunctive use of non-steroidal anti-inflammatory drugs (2, 4). In some patients, conservative treatment does not lead to adequate relief and a return to a normal level of activity. In these patients, surgical intervention may help to relieve pain and rehabilitate patients to a normal level of activity (8, 9). If surgical intervention is necessary, various surgical techniques have been suggested ranging from ossicle resection to fusion (10). There are a limited number of publications in the literature on

the results of arthroscopic ossicle excision, which is one of these techniques. In most studies on this subject, open surgical procedures have been preferred for ossicle excision. Open surgical procedures cause irritation, especially in squatting and kneeling situations, due to the scar tissue located in the anterior part of the knee (11). Due to these negative effects, arthroscopic ossicle excision has become popular, especially in the last decade. It was thought that the arthroscopic excision technique would have advantages over the open technique in accelerating both cosmetic and functional recovery. In addition to these positive aspects, the fact that the arthroscopic technique enables ossicle excision and provides a limited opportunity for tubercleplasty that has been stated as one of the disadvantages of this technique (11). Apart from this basic information, there are a limited number of publications in the literature on the results of arthroscopic ossicle excision, which is one of these techniques.

The aim of this study was to evaluate the mid-term clinical results of patients who underwent arthroscopic excision with the diagnosis of OSD.

MATERIALS and METHODS

Patient Selection

This study was modeled with a retrospective design. The necessary permissions for the study were obtained from the ethics committee of our university. All patients signed an informed consent form for participation in this study.

Patients who underwent arthroscopic excision with a diagnosis of OSD between May 2011 and August 2014 were evaluated retrospectively. Patients who had knee surgery for another reason and had neurovascular pathology in the extremity that underwent surgery were not included in the study. A total of 17 patients met the inclusion criteria, and of these 17 patients, 1 did not volunteer to participate in the study.

All of the patients in the study diagnosed with OSD were primarily treated with conservative therapy, including cold application, elevation, rest and non-steroidal anti-inflammatory drug therapy. After providing the necessary information, arthroscopic excision treatment was recommended to patients whose pain persisted and activities were restricted despite 6 months of conservative treatment. Arthroscopic excision was performed on patients who accepted the operation in order to treat the OSD.

Surgical Procedure

All of the patients were operated on by the same surgeon (MU). The operations were performed under anesthesia after applying a pneumatic lower extremity tourniquet. Anteromedial portals, opened close to the patellar tendon, and anterolateral portals were used for imaging and operation. Patients were first checked for any additional intraarticular pathologies. No intraarticular pathology was present in any of the patients included in the study. After checking the intraarticular area, the retro-patellar and infrapatellar fat pads were debrided away with the help of a shaver to get a clearer image and expand the operation area. After the bone structure was reached, it was freed from soft tissue with the help of a shaver, punch, and radiofrequency. Then, the bone structure was exposed using a grasper. Complete exposure of the bone structure was confirmed intra-operatively via C-arm imaging. After the bone structure was exposed, debridement was applied to the anomalous parts of the retro-patellar surface of the patellar tendon. The disordered parts of the tibial tubercle were rearranged with the help of a burr. Then, the operation was finalized Figure-1.

Rehabilitation

All of the patients were given weight-bearing, joint range of motion, and quadriceps exercises, as tolerated, on the 1st day post-op. The patients were allowed to return to both daily activities and sports without any restrictions after 6 weeks.



Figure-1. Arthroscopic view before ossicle excision (A). Arthroscopic view after ossicle excision (B).

Clinical Assessment

The Visual Analog Scale (VAS) Score (12), Tegner Activity Scale (13), and Lysholm Knee Score (14) forms were administered to the patients in order to compare their pre-operative and post-operative condition. In addition, complications such as infection, residual bone fragments, re-hospitalization or recurrence were evaluated and recorded Figure-2.

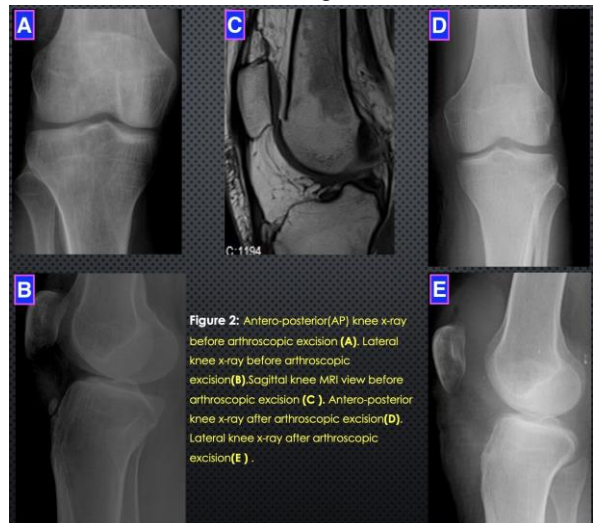


Figure-2. Antero-posterior (AP) knee X-ray before arthroscopic excision (A). Lateral knee X-ray before arthroscopic excision (B). Sagittal knee MRI section before arthroscopic excision (C). Antero-posterior (AP) knee X-ray after arthroscopic excision (D). Lateral knee X-ray after arthroscopic excision (E).

Statistical Analysis

Statistical analysis was performed with IBM SPSS Statistics for Windows 18.0 (IBM Corp., Armonk, NY, USA). The VAS score, Tegner Activity Level score, and Lysholm Knee Scale score preoperative and postoperative outcomes were compared and statistical parameters were calculated (mean, standard deviation, minimum, and maximum value). The t test was applied to determine statistical significance between the pre and postoperative scores.

RESULTS

A total of 16 patients were included in the study, and of these patients, 11 (68.75%) were male and 5 (31.25%) were female. The mean age of the patients is 28.8 (20–41 ± 7) years. The mean follow-up period was 82.9 (61–108 ± 15) months. None of the patients had any infection or residual ossicles. The patients' complaints were improved after surgery. Kneeling and squatting were possible after surgery in all of the patients. The mean time for return to sports-related training activities for all of the patients was 9.2 (8–11) weeks. The preoperative and postoperative mean scores of VAS, Tegner Activity Level Score and Lysholm Knee Scale score are shown in Table-1. After all of the evaluations were completed, the patient who was not included in the study was admitted to our clinic stating that his preoperative complaints had reappeared. This patient was admitted to our clinic 105 months after the surgery was performed. Patients have some symptoms, pain that occurs during physical activity and swelling around the tibial tubercle. Direct radiography and MRI indicated that the patient may have a recurrence of OSD or heterotopic ossification that developed due to surgery. The symptoms (of the patient were not relieved after 6 weeks of conservative treatment. Then, the patient underwent excision through an open surgical procedure. The excised ossicle was submitted for pathological examination and it was concluded that the fragment was compatible with OSD. The patient's VAS Score was 7, Tegner Activity Scale score was 3, and Lysholm Knee Scale score was 61 before the second surgery. The patient returned to both daily and sports activities without any restrictions at 6 weeks postoperatively. The patient's VAS Score was 2, Tegner Activity Scale score was 5, and Lysholm Knee Scale score was 82 at 8 weeks postoperatively. Positive progress was made on all of the scores Figure-3.



Figure-3. Antero-posterior (AP) knee X-ray taken at the patients first hospital admission (A). Lateral knee X-ray taken at the patients first hospital admission (B). Sagittal knee MRI section taken at the patients first hospital admission (C). Antero-posterior (AP) knee X-ray after arthroscopic excision (D). Lateral knee X-ray after arthroscopic excision (E). AP knee X-ray taken when symptoms of OSD begin (F). Lateral knee X-ray taken when symptoms of OSD begin (G). AP knee X-ray after open excision (H). Lateral knee X-ray after open excision (I).

DISCUSSION

OSD is a relatively common disease that especially affects young and adolescent populations (9). Symptoms mostly appear between the ages of 8–15 years, and the symptoms disappear with the completion of skeletal maturation (15). In patients whose symptoms do not improve and who do not respond to conservative treatment, surgical treatment methods can be utilized in order to restore knee function (15, 16). The 1990 study of Krause et al. showed that OSD does not cause a significant loss in activity in 76% of patients if left untreated, but only 60% of these patients can kneel painlessly (17). This may cause OSD to follow a worse symptomatic course and conservative treatment options to fail, especially in patients who need long-term knee hyperflexion or kneeling due to religious and sports activities.

The treatment options for OSD include different surgical procedures such as open surgical, arthroscopic and bursoscopic procedures (10).

Table-1. Patients preoperative and postoperative mean scores

Parameter	Preoperative (Mean±SD)	Postoperative (Mean±SD)	p
Visual Analog Pain Score	6,8±1,1	5,7±1,3	<0,005*
Tegner Activity Scale Score	5,7±0,6	7,8±0,9	<0,005*
Lysholm Knee Score	77,4±4,6	97,7±5,8	<0,005*

The most common approaches of open surgery are the excision of the ossicle and the excision of the prominence in the tibial tubercle (9, 16). In his article, which discussed the results of 35 patients who underwent ossicle excision and tibial Tubercleplasty using the open method, Flowers reported 95% pain relief (16). Similarly, In their study discussing the results of patients who underwent an open surgical procedure, Weiss et al. reported that 2 out of 15 of their total patients could not fully return to sports and daily activities, and 1 of them could not reach the pre-operative levels of activity[9]. El-Husseini et al. also achieved similar clinical results in 37 patients' knees that underwent excision with the open surgical technique that El-Husseini et al. defined themselves (18). Although clinically successful results were achieved, it was reported that sensitivity occurred in 10% of these patients, especially in the surgical incision area, during the postoperative period (9, 18, 19). Although the clinical scores improved, iatrogenic patellar tendon injury and surgical incision-related problems may occur during open surgery (20).

Arthroscopy is a less invasive surgical procedure that causes less intra-articular pathologies and thus it has also been used in the treatment of OSD (15, 21, 22). In their study discussing the results of arthroscopic treatment applied to 11 professional athletes, Circi et al. reported that there was a statistically significant improvement in the patients' Lysholm Knee Scale scores and Tegner Activity Level scores when compared to the pre-operative period, and that they returned to sports activities in a short period of 6 to 7 weeks postoperatively.(20). Circi et al. did not report any complications in the patients who experienced a positive progress in their clinical scores (20). There are case reports in the literature about OSD patients who have achieved successful results through arthroscopic excision using different arthroscopic surgical techniques (15, 22–25). In some of these case reports, giant ossicles were excised. Similar to the aforementioned studies, significant improvement in the clinical scores and complete return to daily/sports activities were achieved after surgery in all of the patients who underwent arthroscopic excision in the current study. It is thought that the

full return to daily activities and sports being achieved at different times in different studies is related to the rehabilitation programs that were followed. This study and the data on this subject in the literature showed that successful results can be achieved with arthroscopic excision in OSD with less invasion and a lower complication rate.

In the current study, only one patient had recurrent symptoms, at 105 months postoperatively. No ossicles were observed in the radiographs of this patient taken after arthroscopic excision. No similar complication(recurrence) has been observed in the literature in any patient who underwent excision using arthroscopic technique (15, 20–25). It was shown in this study that recurrent ossicles may develop, albeit rarely, after arthroscopic excision. This complication, which is rarely encountered, was treated by excision with an open surgical procedure. However, this issue has been made open for discussion through this study. Should revision arthroscopy or open surgical procedures be preferred in the case of recurrence? In order to be able to answer this question, more informative entries into the literature are required.

This study had several limitations. The first of these was the fact that a small number of patients were included in the study. The second limitation was the lack of a control group for comparison with open surgical treatment. The other limitation is retrospective design of this study.

CONCLUSION

Arthroscopic ossicle excision for OSD can be considered an adequate technique when the mid-term results are evaluated. Although rare, recurrence may occur after arthroscopic surgery. In order to demonstrate the superiority of the arthroscopic method over open surgical procedures, comparative studies containing long-term results are required.

Conflict of interest: No conflict of interest was declared by the authors.

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