

A Rare Cause of Lateral Snapping Knee in a 14-Year-Old Female Patient: Popliteus Tendon

Vzácná příčina laterálně lupavého kolena u 14leté dívky: šlacha *m. popliteus*

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SUMMARY

With this case report, we introduced a rare and commonly overlooked cause of lateral snapping knee, a snapping popliteus in a 14-year-old female patient. She was initially treated for a lateral discoid meniscus, a common diagnosis in this age group. Because of the non-resolving symptoms, a second-look arthroscopy was performed and showed a popliteus tendon snapping over a tubercle on the lateral femoral condyle. Resection of the tubercle resulted with a successful outcome. In evaluating the snapping knee in young children, popliteus tendon should be kept in mind.

Key words: snapping popliteus, tubercle, knee, arthroscopy, popping.

INTRODUCTION

Lateral snapping knee is a rare phenomenon, which is characterized by popping sensation at the lateral side of the knee joint at any point of its range of motion. The diagnostic challenge of this condition may lead to prolonged evaluating and treatment procedures. Discoid lateral meniscus, lateral meniscal tears, synovial plicae, tendons (biceps femoris, popliteus), mass lesions and iliotibial band may result in lateral snapping knee (2).

As a seldom cause of snapping on lateral side of the knee, popliteus tendon is usually an overlooked structure, especially in patients with more common diagnoses such as lateral meniscal tear and discoid meniscus (9). We here report a case with snapping popliteus to point out difficulties in diagnostics and treatment of this rare condition.

CASE

A 14-year-old female patient admitted to our clinic with pain and snapping at her left knee. She was an amateur volleyball player at her school team and had no known previous history of any traumatic injury. She had been suffering from these symptoms for nearly one year. At her previous other outpatient clinic visits, conservative treatment including anti-inflammatory agents and health modification was applied. Despite she was compatible with conservative treatment advised previously, her symptoms did not relieve and worsened with time. She had a Lysholm knee score of 70 at her first admission.

At her first admission to our outpatient clinic, a thorough physical examination was performed. There was no effusion on her left knee. Tenderness was obvious on the lateral part of the knee. Full range of motion (ROM) was assessed and any laxity was not detected for liga-

ment injuries or lateral rotatory instabilities. McMurray test was positive for lateral meniscus. Other systemic examinations showed no significant findings.

Direct radiographs of the left knee showed no significant findings. Magnetic resonance imaging (MRI) showed a discoid lateral meniscus, and degeneration at the posterior horn of the medial meniscus. Other structures seemed to be normal in MRI.

In the light of aforementioned findings, diagnostic and therapeutic arthroscopy was planned with the diagnosis of lateral discoid meniscus of the left knee. She and her parents were informed of surgical intervention.

Under general anesthesia and in supine position, anterolateral and anteromedial portals for left knee were opened. Diagnostic arthroscopy revealed a discoid lateral meniscus. After saucerization, lateral meniscus was examined with metal probe and was stable in nature, excluding the Wrisberg-variant discoid meniscus. Posterior horn of the meniscus had a 5-mm sized partial longitudinal tear extending to the tibial surface without reaching the femoral surface. Examination of the partial tear with metal probe showed no displacement of the meniscus, which is considered as stable with no need of repair. No other pathology was noted and the surgery was ended with application of a postoperative hinged knee brace.

Hinged knee brace was adjusted allowing 0–30° ROM for postoperative four weeks. At fourth week follow-up, patient was allowed to remove the brace for a full range of motion under the supervision of physiotherapy. When she had increased the range of motion after the second month, she suffered again from snapping at lateral side of the operated knee. We prescribed anti-inflammatory agents and referred her to physical therapy.

At sixth-month follow-up, the symptoms continued. A repeated physical examination revealed snapping on lateral side of the knee around popliteus tendon at 30°

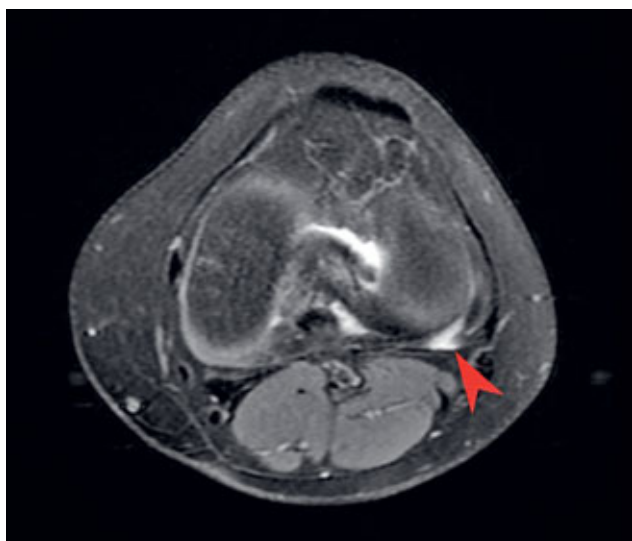


Fig. 1. Pre-operative MRI, red arrow indicating hyperintense popliteus tendon.

of flexion. A control MRI showed a hyperintense feature around popliteus tendon and posterior part of the lateral meniscus. These findings were suspicious for Wrisberg variant of lateral meniscus or popliteal tendinitis (Fig. 1). A second look arthroscopy was planned for post-operative ninth month, which was eligible for the patient.

Second look surgery was performed under general anesthesia. Previous portals were used to enter the joint. The examination of the lateral previously saucerized meniscus showed peripheral instability and the tear was repaired with four all-inside sutures. After successful repair of the meniscus, the knee was examined again and we realized that the snapping at 30° of flexion still continued. Afterward, the scope was introduced from the anterolateral portal to visualize the popliteus tendon, which was observed as long and thickened. Extending the knee beyond 30° degrees resulted in anterior dislocation of the popliteus tendon from the tubercle formation adjacent to the popliteal sulcus (Fig. 2a–c).

A lateral approach to popliteus tendon was performed. After splitting the distal iliotibial band in a longitudinal fashion, we observed the popliteus tendon and the tubercle causing the snapping the tendon (Fig. 3). The tubercle was excised with a rongeur and rasped to obtain an appropriate sulcus for the popliteus tendon. The stability of the tendon and the joint was assessed and there was no need for a tenodesis of the popliteus tendon. Snapping phenomenon resolved completely during the whole ROM of the knee intraoperatively. After completion of the surgery, a postoperative hinged knee brace had been applied for four weeks allowing 0–30° of ROM. At her fourth-week follow-up visit, she was encouraged for 90° of ROM with gradually increase until sixth week. After postoperative sixth week full ROM was allowed. At her sixth month and first-year visit after the second surgery, she stated that her snapping and pain symptoms were completely resolved. Her Lysholm knee score was increased to 95.

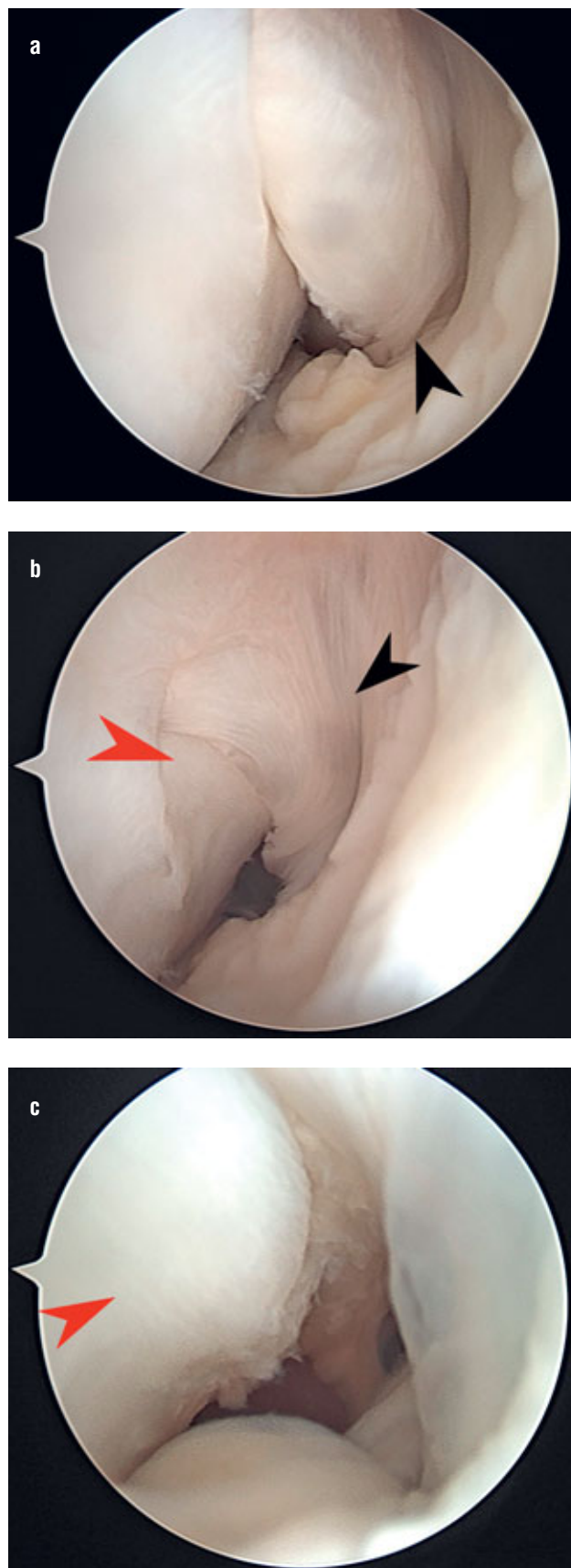


Fig. 2. Intra-operative images for evident snapping phenomenon over the tubercle with increasing flexion from a–c; red arrows indicate the tubercle, black arrows indicate the popliteus tendon.

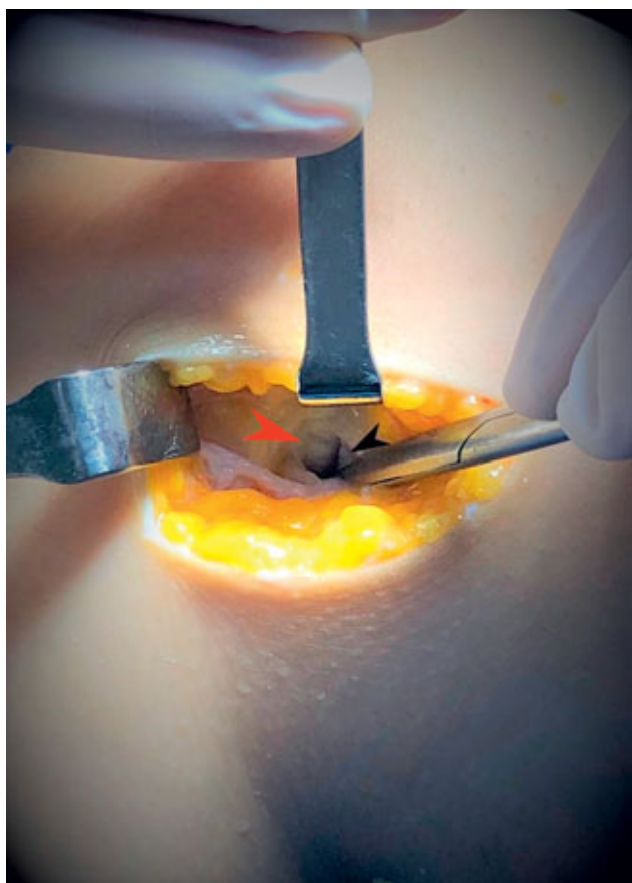


Fig. 3. Open exposure for the tubercle excision; red arrow indicates the tubercle, black arrow indicates the popliteus tendon.

DISCUSSION

With an incidence of 0.4–17%, discoid lateral meniscus is a common anatomic variant (5). Fifty-five percent of the child patients with discoid lateral meniscus may have a popping sensation at the lateral side of the knee (10). Therefore, children with lateral snapping would be initially investigated for discoid meniscus. Additional confirmation of its diagnosis with MRI may direct the surgeon's attention solely on it. The treatment strategy of the patient in current case started in the light of her primary confirmed diagnosis, but an unsuccessful outcome after conservative and surgical management had led us to find out the real cause of the snapping. Snapping could be caused by lateral rotational instability resulting from lateral meniscal pathology, which could be treated with anterolateral ligament reconstruction (6). But the physical examination was negative for rotational instabilities. In the second-look surgery, visualization of the popliteus tendon snapping over a tubercle from anterolateral portal revealed the exact diagnosis and resulted in favorable outcome at the end.

Most patients with asymptomatic discoid meniscus do not require treatment. Persistent symptoms are the main indication for surgery when treating the discoid

meniscus. The meniscus should be preserved stable and near-normal anatomical shape to prevent degenerative changes. In their recent review article, Saavedra et al. (11) offered an arthroscopic treatment algorithm. Arthroscopy should begin by determining the meniscus's shape, stability, and tears. Next, the surgeon should reshape the meniscus to mimic a normal variant and repair any accessible tears. Finally, the unstable discoid meniscus should be fixed after confirming its peripheral stability. Hashimoto et al. (4) concluded in their current case report that meniscal displacement, indicative of an unstable variant, can be detected preoperatively by further MRI analysis performed in full extension and flexion.

In the literature review, the number of reported cases is limited. Mariani et al. (9) reported three cases with snapping popliteus, where two of them had a previous history of partial lateral meniscectomy performed in another institution. After arthroscopic diagnose, they have treated the first patient, because of their poor awareness, conservatively, which resulted in persistent snapping after all. The next two patients were treated with stabilization of the tendon to its sulcus resulted in successful outcome. Cooper (3) reported six cases with popliteal snapping, where four of them were treated conservatively and two cases were treated surgically. According to their report, the surgically treated first case remained unsuspected in terms of snapping popliteus until arthroscopic examination. They performed smoothing of the tubercle causing snapping and tenodesis of tendon. Snapping of the second case was a result of surgically treated osteochondritis dissecans lesion, which is treated by resection of the popliteus tendon without resulting in instability. Krause et al. (7) treated a 21-year-old patient having snapping popliteus resulted from a tubercle. They performed resection of the tubercle and tenodesis of the tendon, which resulted in successful outcome. Recently, Su et al. (12) reported a case having a sesamoid bone called cyamella in the popliteus tendon, which caused a lateral snapping and they treated it by excision of it. In the light of these reported cases, one can conclude that the treatment strategy is mostly dependent on the awareness and experience of the surgeon and the cause, which leads the tendon to snap.

Snapping popliteus is a dynamic condition, where the tendon snaps out of its groove at 30–40° of flexion (3, 7, 9). In the aforementioned reports, all radiological investigations including direct radiographs and standard MRI were negative for a pathology of the tendon, because of their inherent static nature. Dynamic ultrasonography may be useful for demonstrating the popliteus tendon's snapping or diagnosing other dynamic causes leading to snapping (8, 9). The hyperintense signals of popliteus tendon indicating tendinitis in MRI may be a clue for the diagnosis. For these cases, the popliteus sulcus depth can be measured and its ratio to lateral condylar width can be calculated for a possible popliteus pathology, as described by Aumann et al. (1).

During the evaluation of a young patient with lateral snapping, popliteus tendon must be remembered. The

treatment strategy varies with the cause leading the popliteus to snap, therefore appropriate diagnostic approaches should be performed in these patients. A basic dynamic examination of the lateral part of the knee for popliteus tendon pathologies is important for the surgeon and the patient. Surgeons should perform a thorough arthroscopic examination to evaluate all possible causes of snapping in order to avoid additional surgery.

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