



Case Report

Sinding-Larsen-Johansson Syndrome in a 9-Year-Old Tennis Player: A Case Report

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ABSTRACT

Sinding-Larsen-Johansson syndrome (SLJS) is a rare cause of anterior knee pain in young athletes and is often underdiagnosed due to low clinical suspicion and poorly recognized features. A 9-year-old female tennis player presented with anterior knee pain; radiographs showed patellar fragmentation, and MRI confirmed edema at the patellar tendon insertion. Conservative management with rest resulted in the complete resolution of symptoms and return to sport. This case highlights the clinical and radiological features of SLJS in a 9-year-old athlete, emphasizing the importance of MRI in confirming the diagnosis and facilitating timely management.

Keywords: Adolescent athlete, overuse injury, patellar apophysitis, pediatric knee pain, Sinding-Larsen-Johansson Syndrome



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INTRODUCTION

Sinding-Larsen-Johansson Syndrome (SLJS) is a relatively uncommon but clinically significant cause of anterior knee pain in active adolescents. This condition, first described independently by Sinding-Larsen and Johansson in 1921, is a traction apophysitis affecting the proximal attachment of the patellar tendon to the inferior pole of the patella ^[1,2]. It is part of the spectrum of overuse injuries common during adolescence, characterized by rapid growth and increased participation in sports and physical activities. SLJS is often compared to Osgood-Schlatter disease, another apophysitis affecting the extensor mechanism of the knee, but differs in its anatomical location and clinical presentation ^[3]. While the pain in Osgood-Schlatter disease is more localized to the tibial

tubercle, SLJS pain predominantly focuses on the inferior pole of the patella.

SLJS is a rare condition with distinct prevalence rates in the general adolescent population and young athletes. In a population-based study involving adolescents aged 12-15 years, SLJS was identified in 0.8% of participants who underwent MRI imaging, underscoring its rarity in a non-athletic, general cohort ^[4]. In contrast, sports populations, particularly those engaged in high-impact activities such as soccer, show a higher incidence due to the repetitive stress on the extensor mechanism of the knee. A study of young soccer players revealed that SLJS was present in 10 out of 106 athletes (9.4%) who underwent radiographic or ultrasonic evaluations for knee pain, highlighting its

increased prevalence in physically active adolescents [5]. Materne et al. [6] further supported this by reporting on a four-year prospective study involving 551 youth soccer players, during which 307 physeal injuries were identified, comprising 14% of all recorded injuries. Among these, apophyseal injuries accounted for 85% (258 cases), with SLJS representing 16 cases or 6% of the total injuries observed.

Given the rarity of SLJS, there is often a low index of suspicion among clinicians, and its clinical and radiological features are not well-recognized, leading to potential underdiagnosis or misdiagnosis and delays in appropriate management. This case report contributes to the growing literature on SLJS by highlighting its characteristic clinical presentation, imaging findings, and successful conservative management in a young female tennis player. The unique aspects of this case include the patient's early age, the use of magnetic resonance imaging (MRI) to confirm findings, and the role of complete rest in achieving symptom resolution and a return to sports. By documenting these features, this report aims to improve awareness and understanding of SLJS among healthcare professionals, particularly in pediatric and sports medicine, and to facilitate the early and accurate diagnosis of this condition in young athletes presenting with anterior knee pain.

CASE REPORT

A 9-year-old female tennis player presented with anterior knee pain, persisting for several weeks. The pain had a gradual onset, with no history of acute trauma or significant past medical issues. It was exacerbated by physical activity, particularly during tennis training, and partially subsided with rest, only to recur after subsequent training sessions. On physical examination, the patient demonstrated a complete and pain-free range of motion in the affected knee. Ligamentous stability tests were normal, indicating no instability. Tenderness was elicited at the patellar tendon and its junction with the inferior pole of the patella upon palpation. Neurovascular examination and muscle strength testing were normal.

Plain radiographs of the knee revealed fragmentation at the distal pole of the patella, consistent with SLJS (Fig. 1). Initial management included recommendations to reduce training intensity and frequency and rest from sports activities. Despite adherence to this conservative approach, the patient continued to experience pain after four weeks. Further evaluation with MRI revealed edema at the inferior pole of the patella, corroborating the diagnosis of SLJS (Fig. 2). Based on these findings, the management plan was revised to include complete rest from sports activities. The patient reported a complete resolution of her knee pain at the three-month follow-up. She subsequently resumed tennis training under a structured and gradual return-to-sport program. The tennis

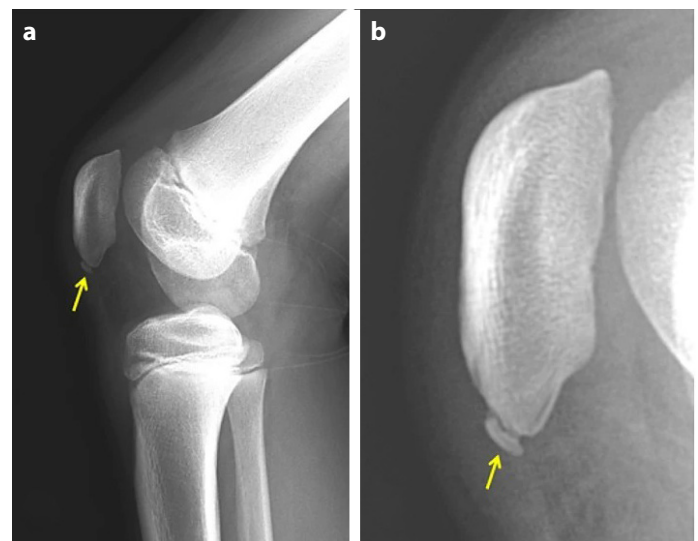


Figure 1. (a) Lateral knee radiograph showing fragmentation at the inferior pole of the patella (yellow arrow), characteristic of SLJS. (b) Magnified view of the inferior patellar pole highlighting the fragmented and irregular appearance (yellow arrow), consistent with apophyseal injury.



Figure 2. (a) Sagittal T2-weighted MRI showing edema and signal changes at the inferior pole of the patella (yellow arrow), consistent with inflammation due to traction apophysitis. (b) Axial T2-weighted MRI highlighting increased signal intensity at the patellar tendon attachment site (yellow arrow), confirming the diagnosis of SLJS.

training program was initiated with one session per week for a period of one month, subsequently transitioning to two sessions per week. At the six-month follow-up, she had returned to her usual level of activity without any recurrence of symptoms, demonstrating successful recovery with conservative management.

DISCUSSION

This case highlights the clinical, diagnostic, and management aspects of SLJS in a pediatric athlete, reinforcing the key points reported in the literature. The 9-year-old tennis player presented with activity-related anterior knee pain and tenderness at the inferior pole of the patella, symptoms consistent with previous descriptions of SLJS [7]. Radiographic imaging revealed patellar fragmentation, a hallmark finding which guided the initial diagnosis and conservative management. This aligns with reports emphasizing the utility of plain radiographs in diagnosing SLJS [3,8].

Conservative management, including rest and activity modification, is typically adequate for SLJS, as most cases respond well to reduced physical load [3,8]. However, persistent symptoms in this patient necessitated further investigation with MRI to rule out other causes of anterior knee pain seen in adolescents such as osteochondral lesions and patellofemoral instability. The MRI findings, showing bone marrow edema at the inferior pole of the patella, provided additional confirmation of the diagnosis and ruled out alternative conditions such as patellar sleeve avulsion fractures, which require different management strategies [9,10]. This case underscores the value of advanced imaging in cases where symptoms do not resolve as expected.

The etiology of SLJS involves repetitive mechanical stress and microtrauma at the osteotendinous junction, compounded by the rapid skeletal growth seen during adolescence. This period of musculoskeletal development increases vulnerability to conditions like SLJS, particularly in young athletes engaged in sports that involve jumping, sprinting, or frequent directional changes [11]. The biomechanical stresses associated with these activities contribute to the development of apophyseal injuries, with SLJS representing a specific manifestation at the inferior pole of the patella.

The management approach in this case was consistent with existing guidelines, focusing on activity modification, rest, and symptom relief through icing and nonsteroidal anti-inflammatory drugs (NSAIDs). The use of physical therapy to improve flexibility and strengthen the quadriceps and hamstrings aligns with best practices for managing SLJS [4,12]. The gradual return-to-sport protocol ensured the patient resumed athletic activity without symptom recurrence, highlighting the importance of structured rehabilitation. Preventative measures are essential in reducing the risk of SLJS in young athletes. These include regular stretching, warm-up exercises, and strengthening programs targeting the quadriceps and hamstrings. Monitoring training loads and incorporating adequate rest periods, especially during growth spurts, are also critical in minimizing stress on the patellar tendon. Early recognition of symptoms and timely

intervention remain vital in preventing progression and facilitating recovery [11].

Although this report is limited by its single-case nature and the absence of long-term follow-up data, it adds to the understanding of SLJS, particularly in pediatric athletes, by illustrating the importance of clinical and radiological findings in early diagnosis, the role of advanced imaging in persistent cases, and the benefits of conservative management. Future research could explore long-term outcomes and risk factors for chronic symptoms in patients with SLJS [4,7,11].

DECLARATIONS

Author Contributions: Idea/Concept – EMK, HC; Design – EMK, KKK; Control/Supervision – KKK, EMK; Data Collection and/or Processing – EMK; Analysis and/or Interpretation – EMK, HC; Literature review – KKK, HC; Writing – EMK; Critical Review – HC, KKK; References and fundings – KKK, HC; Materials –EMK.

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ABBREVIATIONS

SLJS - Sinding-Larsen-Johansson Syndrome

MRI - Magnetic Resonance Imaging

ROM - Range of Motion

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