

## Pellegrini-Stieda Disease: Between Ossification and Dysfunction in Post-Traumatic Knee Sequelae

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### Abstract

### Case Report

Pellegrini-Stieda syndrome is an uncommon condition, often occurring after trauma, that involves the ossification or calcification of the knee's medial collateral ligament (MCL). This process can lead to pain, stiffness, and restricted joint mobility. We describe the case of a 48-year-old patient who experienced left knee trauma 10 months earlier and underwent surgery for a patellar cartilage lesion three months ago. The patient presented with persistent knee pain and stiffness, prompting suspicion of Pellegrini-Stieda syndrome. Diagnosis was confirmed by X-ray and MRI. The patient was managed conservatively with rest, anti-inflammatory medications, and physiotherapy. Although symptoms continued, gradual improvement was observed, and no surgical intervention was necessary. This case underscores the importance of imaging, especially MRI, in accurately diagnosing and evaluating the extent of ossification, which helps guide treatment decisions and prevent premature surgery.

**Keywords:** Pellegrini-Stieda Syndrome, Post-Traumatic Knee Sequelae, Standard Radiography, MRI and CT Scans.

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## INTRODUCTION

Pellegrini-Stieda disease is characterized by the ossification of the knee's medial collateral ligament (MCL) [1, 2], typically resulting from trauma or repeated microtraumas [3]. Initially described by Pellegrini in 1905 and later refined by Stieda in 1908 [4], the condition is often asymptomatic and discovered incidentally on a standard X-ray. In some instances, however, it can manifest as chronic pain and reduced knee mobility, thereby constituting Pellegrini-Stieda syndrome [2].

The precise cause of this ossification is still debated. While it is commonly linked to the MCL, some researchers suggest that adjacent structures, such as the medial gastrocnemius muscle insertion, may also be involved [5, 6]. As such, the Pellegrini-Stieda lesion may represent a spectrum of trauma-induced processes leading to medial distal femur ossification.

Imaging is crucial for diagnosis. Standard radiography remains the preferred method for detecting calcifications, while MRI and CT scans are valuable in

assessing complications and refining differential diagnoses [7].

This report analyzes the radiological aspects of Pellegrini-Stieda disease, highlighting the contributions of various imaging modalities in both diagnosis and management.

## CASE PRESENTATION

A 48-year-old male patient presented with ongoing pain and stiffness in his left knee. He had a history of knee trauma 10 months prior and had undergone surgery for internal meniscus lesion three months earlier. The clinical evaluation raised concerns about an injury to the medial collateral ligament with associated features of Pellegrini-Stieda syndrome.

### Radiological Examination:

- **X-Ray:**

A standard knee radiograph revealing calcifications at the medial femoral condyle that are consistent with Pellegrini-Stieda syndrome. (Figure 1)

- **CT Scan:**

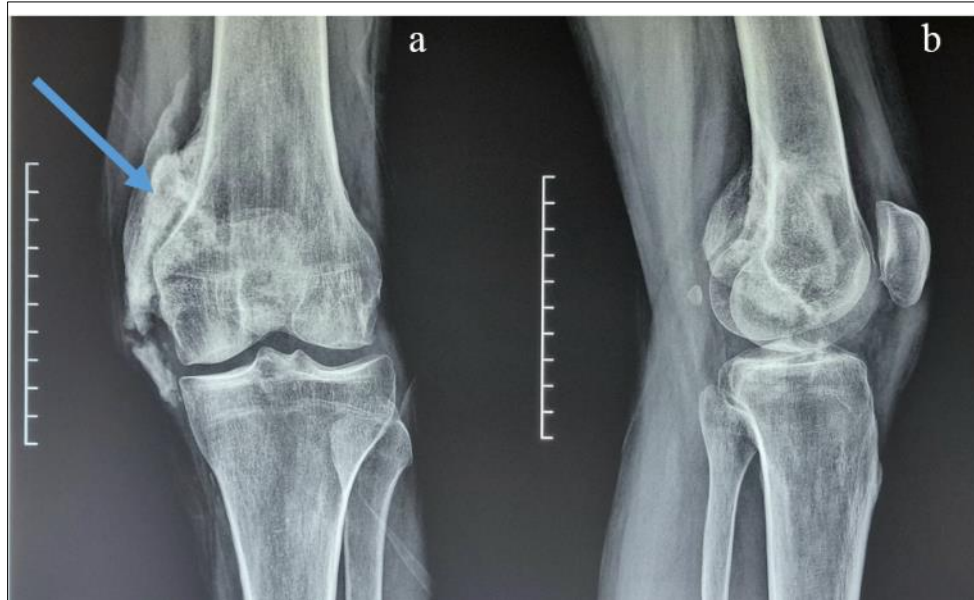
Next, the CT scan confirmed heterotopic calcifications related to the ossification of the medial collateral ligament (MCL), thereby affirming the

diagnosis of Pellegrini-Stieda syndrome. (Figure 2)

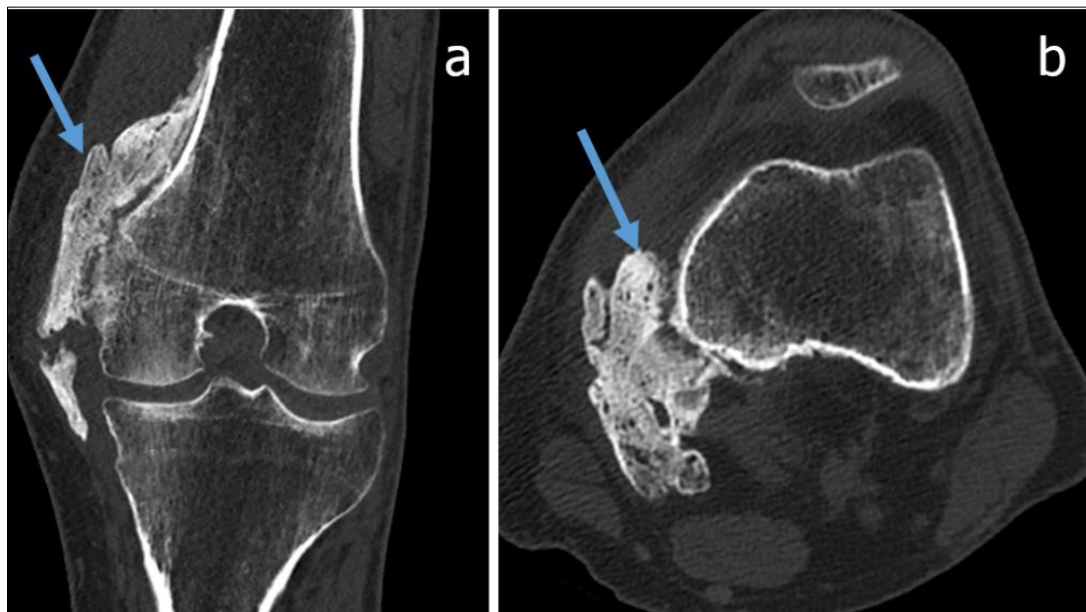
- **MRI:**

Finally, the MRI demonstrated a soft tissue collection in the subcutaneous region near the medial femoral condyle. This area showed signal voids on all

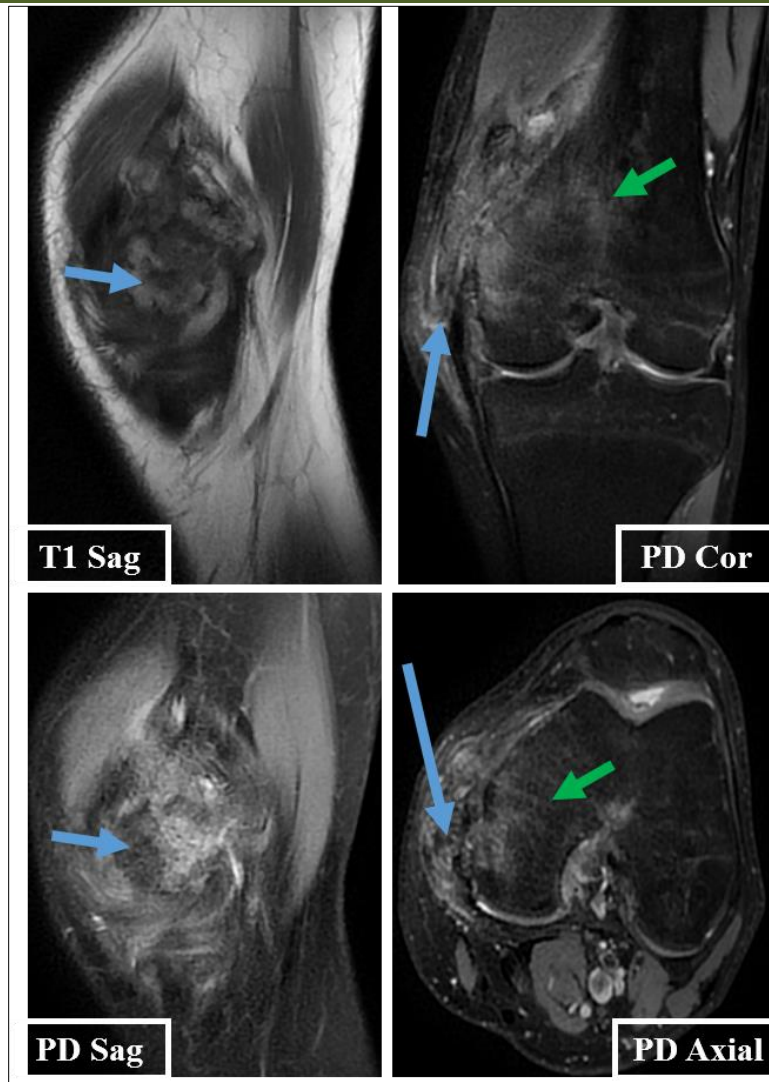
sequences, indicative of heterotopic macrocalcifications. Additionally, there was a mild joint effusion, and the medial femoral condyle exhibited high signal intensity on PD sequences extending to the distal metaphyseal-diaphyseal junction, suggesting bone marrow edema. (Figure 3)



**Figure 1: Standard radiographs of the knee: Anteroposterior (a) and lateral (b) planes, showing calcifications of the lateral collateral ligament (LLM) (blue arrow), consistent with Pelligrini-Steida syndrome**



**Figure 2: CT scans of the knee: Coronal (a) and Axial (b) planes showing the presence of heterotopic calcifications (blue arrow) related to ossification of the medial collateral ligament (MCL)**



**Figure 3: MRI scans of the knee reveal a soft tissue collection near the medial femoral condyle with heterotopic macro-calcifications (blue arrow), minimal joint effusion, and bone marrow edema in the medial femoral condyle (orange arrow). Radial tears are also noted in the medial meniscus**

The diagnosis of Pellegrini-Stieda syndrome was confirmed, noting a lesion of the medial collateral ligament and heterotopic calcifications visible on MRI and corroborated by CT scan. A grade III meniscal tear, as classified by Stoller, was also identified. The patient was managed conservatively with ongoing clinical and radiological follow-up.

## DISCUSSION

Pellegrini-Stieda syndrome is a condition that typically results from post-traumatic calcification of the knee's medial collateral ligament (MCL). Which is often associated with pain and restricted knee flexion [4]. Although uncommon, it typically follows knee trauma, such as fractures or sprains [8, 9]. The pathogenesis theories include calcification of a post-traumatic hematoma, usually occurring more than three weeks after the injury, or an inflammatory response to repetitive microtrauma [3-10].

The exact origin of this ossification remains a topic of discussion, although several hypotheses have been proposed. Pellegrini suggested that the calcification arises from periosteal proliferation with metaplasia of the ligament tissue [4]. Stieda, on the other hand, proposed that the lesion is related to an avulsion fragment of the medial femoral epicondyle with subperiosteal proliferation [10]. Other theories include a form of ossifying myositis or calcifications resulting from a hematoma after trauma [11].

Radiologically, Pellegrini-Stieda syndrome is characterized by an elongated or crescent-shaped, well-defined ossification adjacent to the medial femoral condyle. This ossification is identifiable on standard radiographs and CT scan, also can be characterized by MRI, where it appears as low signal on T2\* sequences [7]. MRI is particularly useful for assessing the involvement in the medial collateral ligament. In cases of surgical excision, it helps determine the adherence of

the calcified mass to the MCL and the amount of remaining ligament tissue [9-12].

In our case, the patient presented with persistent pain and stiffness in the left knee after trauma that occurred 10 months earlier, followed by surgery for internal meniscus lesion. The clinical evaluation raised concerns about an injury to the medial collateral ligament or periarticular ossification. Imaging played a key role in the differential diagnosis, allowing visualization of the lesion and exclusion of other causes such as femoral condyle fracture, periostitis, or calcification in the synovial bursa.

The initial treatment of Pellegrini-Stieda syndrome generally involves conservative measures such as joint rest, anti-inflammatory drugs, and physical therapy. In more severe cases, where pain persists and knee mobility is significantly limited, surgical excision of the calcified mass may be considered [9]. For our patient, conservative treatment was chosen, leading to symptomatic relief.

It is important to note that ossification can sometimes resolve spontaneously, but in some cases, it may increase in size, leading to further restriction of knee movement. Therefore, regular follow-up with serial imaging is essential to monitor the progression of the lesion and adjust treatment accordingly.

## CONCLUSION

In summary, despite its rarity, Pellegrini-Stieda syndrome should be considered in patients with persistent knee pain following trauma, particularly when calcifications are evident on imaging. A comprehensive evaluation using standard radiographs, CT scans, and MRI offers complementary information: radiographs help detect initial calcifications, CT scans provide detailed assessment of ossification, and MRI evaluates associated soft tissue and bone marrow changes. This multimodal imaging approach is crucial for accurate diagnosis and optimal therapeutic management.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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