

## Iselin's Disease: Case Study and Literature Review

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### Abstract

We report a case of a 14-year-old soccer player with Iselin's disease. Iselin's disease is a benign adolescent growth disturbance, called apophysitis, of the base of the fifth metatarsal caused by traction of the m. peroneus brevis tendon. This type of apophysitis is extremely rare. A review of the literature revealed only 17 cases of Iselin's disease. The diagnosis can be confirmed by radiographic features. A review of the literature offers a better comprehension of clinical and radiographic characteristics, differential diagnosis, treatment and prognosis of Iselin's disease.

**Keywords** Iselin's disease; Apophysitis; Jones' fracture; Avulsion fracture; Stress fracture

### Introduction

Iselin's disease (ID) is a benign adolescent growth disturbance, called apophysitis, of the base of the fifth metatarsal caused by traction of the m. peroneus brevis tendon. Dr. Hans Iselin, a German physician, described this pathology for the first time in 1912 [1]. Since then, only seventeen cases have been reported in literature (Table 1). Probably, ID is underdiagnosed due to absence of recognition and the paucity of suspicion. The confusing pathology of the proximal part of the fifth metatarsal can make ID difficult to differentiate from an avulsion fracture, a Jones' fracture, a stress fracture of the base of the fifth metatarsal or an os vesalianum.

Most of the patients are adolescents presenting with pain, and sometimes swelling, over the lateral aspect of the midfoot that is exacerbated by increased physical activity. We present a case and discuss the literature to provide an opportunity to better understand the clinical and radiographic characteristics, differential diagnosis and treatment of Iselin's disease.

### Case Report

A 14-year-old boy visited our Physical and Rehabilitative Medicine Department. He presented with pain at the base of the fifth metatarsal of the left foot. At first, the pain was only present during physical activity, like playing soccer. After a few weeks, the pain was also present during daily activities, such as walking. There was no history of trauma. The boy was an avid sportsman. He played soccer four times a week. On physical examination, there was a small protrusion of the fifth metatarsal base. However, there was no increased local heat, no edema, no ecchymosis or no effusion. Direct pressure was painful at the base of the left fifth metatarsal. Walking was painful. Tip-toe walking increased the pain, heel walking was not painful. Eversion of the foot by contracting the m. peroneus aggravated the pain. The patient was known with pedes cavi.

Radiographic examination showed a small bony fragment lateral to the base of the fifth metatarsal and an irregular apophyseal line (Figures 1-2). According to radiological findings, the diagnosis of Iselin's disease was made.



**Figure 1:** Lateral oblique radiograph of the left foot of the patient showing a bony fragment lateral to the base of the fifth metatarsal oriented longitudinally.

The patient was treated conservatively. He was prescribed a foot orthosis with small lateral raise, which unburdened the m. peroneus brevis. He was also advised to abstain from running, jumping or pursuing other aggravating activities. Eight weeks later, the boy presented again without pain during Activities of Daily Living (ADL) and a normal physical examination. He could resume his soccer activity without any pain. A new X-ray was not ordered. Three years later he presented with an eversion trauma of the left ankle. A plain radiograph of the left foot showed no anomalies. The small bony

fragment was incorporated in the fifth metatarsal. Up till then, he had no further complaints of his left foot.



**Figure 2:** Lateral oblique radiograph of the left foot of the patient showing an irregular apophyseal fragmentation.

## Discussion

A systematic review of articles published in literature focusing on Iselin's disease was performed. The researchers identified 17 cases of ID through an extensive PubMed and EMBASE search of the literature for the terms "Iselin's disease" and "Traction apophysitis of the fifth metatarsal" (Table 1). Of the 18 published cases of Iselin's disease, our case included, nine cases occurred in male patients and nine in female patients (ratio M/F: 1/1). The overall average age was 13 years with a mean and median age of 11 years for girls and 14 years for boys. The age of the patients ranged from 10 to 20 years. It should be mentioned that this is the age of diagnosis. The two cases of patients who were older than 15 years, were cases of nonunion and were not diagnosed from the beginning [2,3].

Authors	Years	Gender	Age	Symptoms	Sports
Iselin H.	1912	F	13	Pain, Swelling	/
Tessore et al.	1971	M	11	Pain	/
Tessore et al.	1971	F	10	Pain	/
Selivanov et al.	1973	M	15	Pain, Swelling, Redness, Limping	Athletics
Selivanov et al.	1973	M	10	Pain, Swelling	/
Lehman et al.	1986	F	10	Pain, Swelling	Roller Skating
Lehman et al.	1986	F	12	Pain, Swelling	Ballet
Schwartz et al.	1991	M	13	Pain	/
Canale et al.	1992	F	11	Pain	Gymnastics, Basketball
Canale et al.	1992	M	13	Pain, Limping	Athletics

Canale et al.	1992	M	20	Pain, Swelling	Basketbal
Canale et al.	1992	F	10	Pain, Swelling	/
Ralph et al.	1999	M	17	Pain, Swelling	Athletics
Rucci et al.	2003	F	13	Pain	Gymnastics
Rucci et al.	2004	F	12	Pain	/
Deniz et al.	2014	F	10	Pain, Swelling, Limping	/
Kishan et al.	2015	M	14	Pain, Swelling	/
Present case	2016	M	14	Pain, Swelling	Soccer

**Table 1:** Cases of Iselin's disease published in the literature.

Iselin disease was originally described in 1912 as a traction apophysitis of the base of the fifth metatarsal [1]. Although the exact etiology of ID is not known, it had been classified under the title of osteochondrosis when seen in growing children. Traction at the m. peroneus brevis tendon insertion distracts a secondary center of ossification from the body of the fifth metatarsal [4,5]. Repetitive microtraumata of this apophysis result from traction of the m. peroneus brevis during sport activities [5,6]. This pathology is usually seen in children who are engaged in sporting activities which require jumping and running [4]. The published cases included adolescents who performed gymnastics, dancing, roller skating, soccer, basketball and athletics.

Patients with ID present with pain over the lateral midfoot. The pain occurs gradually and exaggerates by activities, such as running and jumping, and is relieved with rest. Swelling over the lateral midfoot and intermittent limping may also be a presenting symptom.

Physical examination may show a soft tissue swelling and enlargement of the tuberosity. The most obvious clinical signs are a painful palpation over the tuberosity of the fifth metatarsal and pain while walking or jumping [7]. Generally, there is very little or no edema, erythema or ecchymosis. Resisted eversion produces discomfort, as does plantar flexion [6]. During the clinical examination, the physician should be aware for instability, deformity, joint crepitus and loss of motion [2,4]. In our case tip-toe walking was painful, this painful sign is in no other case described. Our patient was also known with pedes cavi. Pedes cavi is a risk factor for ID, due to the increased load at the lateral row.

Radiographic examination plays an important role in the diagnosis of Iselin's disease. Two typical radiographic features are shown on plain radiograph:

1. An obliquely oriented small bony fleck at the base of fifth metatarsal, which is best seen on oblique radiograph
2. An apophyseal irregularity [8].

These radiographic findings must be correlated with clinical symptoms to make the diagnosis of Iselin's disease. Other types of imaging are not required for the diagnosis. If done, an MRI will generally show increased signal intensity on T2 and STIR images due to bone marrow edema [6,9]. A technetium bone scan will show an increased uptake over the apophysis [6]. A bone scan at such a young age is not recommended for this condition because of the high dose of radiation which is exposed to the body of the patient. The diagnosis of

Iselin's disease should be made after exclusion of other possible reasons for pain and swelling at the base of fifth metatarsal. Differential diagnosis includes Jones' fracture, avulsion fracture, stress fracture of the base of the fifth metatarsal and os vesalianum. Accurate history aims to exclude prior trauma, penetrating injury and infection. An apophysitis remains a clinical diagnosis supported by radiological investigations.

Treatment of Iselin's disease is mainly based on conservative measures. The initial treatment concerns to eliminate the causative forces. Ice packs around the lateral aspect of the foot allows the inflammation to decrease in milder cases. In previous cases NSAIDs were prescribed to limit the inflammation [2-3,6]. It is important to counsel your patient on the importance of rest from sports and all activities that cause pain [10]. This means no sports for some weeks and eventually the use of partial weight-bearing crutches. After a period of immobilization, when the pain and tenderness is completely resolved, physical therapy with exercises to strengthen the peroneus muscles, to increase the range of motion and to improve flexibility should be initiated [10]. In our case we prescribed rest and foot orthosis with a small lateral raise. Foot orthosis with a small lateral elevation or a lateral wedge ensures reduced stress on the peroneal muscles during daily activities, such as walking, and running. Our patient was pain free within eight weeks and showed up to now no more symptoms of his affected foot. Three years later, a plain radiograph of his left foot showed no anomalies.

Iselin's disease is a self-limiting disorder and mostly responds well at conservative treatment. It has a good prognosis. Young athletes may return to sport when they are pain-free and have regained full strength [10]. Radiographic examination, to check if the adolescent is ready to return to sports, is useful to prevent relapse. Generally, a complete relief of pain was seen within 3 to 12 weeks. However, physicians should pay attention to the failure of conservative treatment. When ID is not treated properly at young age, the development in nonunion is feasible. Canale (1992) and Ralph (1999) reported a case of nonunion [2,3]. When Iselin's disease develops in nonunion, a surgical intervention, either by resection or fixation at the nonunion site, may be indicated. Excision of the proximal osseous fragment is recommended as long as the eradicated bone does impede the function of the peroneus brevis tendon or stability of gait [3].

## Conclusion

Iselin's disease should be suspected in teenagers around 10-15 years of age who present with lateral foot pain. A thorough history and good physical examination are important. Traction apophysitis of the fifth metatarsal base is most commonly seen in athletic teenagers without a history of trauma. The most obvious clinical sign is a painful palpation over the tuberosity of the fifth metatarsal. Radiographic examination is characteristic and is crucial to make the diagnose. The diagnosis of ID could be missed by the better-known differential diagnoses as Jones' fracture, avulsion fracture and stress fracture. ID is usually self-limiting. Management is by conservative methods in the form of rest, ice packs and an orthosis with a lateral wedge. The prognosis is good. Although, physicians should be aware for nonunion. In those cases a more aggressive approach, like surgical excision, is needed.

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