

# Delayed diagnosis of non-traumatic acute compartment syndrome in an adolescent athlete

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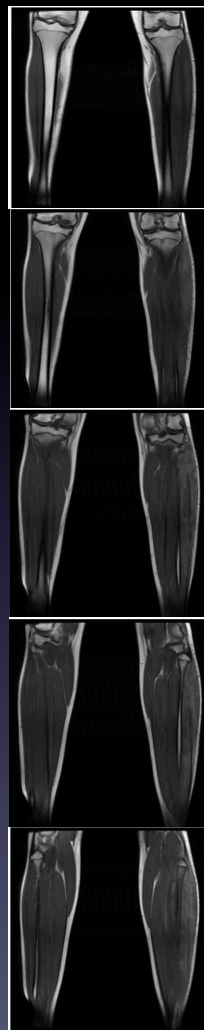
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**Summary:** A 15 year-old male presented with four days of left sided flaccid paralysis in ankle dorsiflexion after an atraumatic “cut” to juke an opponent during a football game. He was seen by two separate health care providers over those four days before being diagnosed with compartment syndrome for which he underwent urgent fasciotomy. After six weeks of physical therapy he recovered to the point of continuing to play competitive high school sports with only residual foot pain manifesting a year later.

**Background:** Compartment syndrome is a condition that most commonly presents after fracture, crush injuries, constrictive dressings, casts, reperfusion of ischemic limbs and thermal burns. The most common cause of acute compartment syndrome in children and adolescents is fracture (85% of cases).<sup>1</sup> Fracture is followed by blunt soft-tissue injury (i.e. crush injuries), which accounts for 23.2% of presentations.<sup>2</sup> Non-traumatic events in sports, as seen in this case, is usually not listed as an etiology of acute compartment syndrome in literature reviews of the topic.

Delayed diagnosis of compartment syndrome can be functionally devastating. A study by Sheridan, et al. of 44 individuals with 66 cases of acute compartment syndrome showed that fasciotomy done more than 12 hours after onset of the compartment syndrome is associated with only eight percent of patients regaining normal function. Even in those who had surgery within 12 hours, only 68% of them recovered normal function.<sup>3</sup>

**Case presentation:** A 15 year-old African-American male with no significant past medical history presented with four days of left lower extremity swelling, pain, and weakness. He was playing football four days prior when he reported “cutting” to juke an opponent and felt a popping sensation in his left knee. He noted immediate onset of throbbing pain in the front and lateral aspect of his leg but no trauma was reported at the time of the injury. The patient kept playing and “cutting” in the game despite the pain. Over the course of the next few days he went to two emergency departments and his school's athletic trainer where he was diagnosed with a muscle strain, then cellulitis. The patient reported the presence of severe pain, burning, and swelling in the anterolateral aspect of his leg accompanied by numbness and tingling in the dorsum of his foot.



From top to bottom: anterior to posterior MRI bilateral calves. Hyperintensity demonstrated in lateral compartment. Central hypointensity representative of hematoma.

**Differential diagnosis:** Compartment syndrome was the leading differential diagnosis after initial encounter due to the combination of numbness, tingling, weakness, swelling, and tenderness of the anterior and lateral compartments, and absent sensation over the anterior aspect of the ankle joint. Common fibular neuropathy was next on the differential diagnosis because of the pattern of numbness and weakness and a fibular or tibial plateau fracture could have stretched or severed the fibular nerve. However, x-ray showed no fracture. A torn muscle would explain the foot drop and swelling appreciated on exam, however, it would not explain the absence of sensation over the proximal dorsum of his foot. The ACL is often the structure injured during cutting injuries, and he could have had intra-articular swelling enough to mask a positive Lachman's. Additionally, this would not produce isolated numbness or isolated leg compartment swelling. A long hypochoic structure was noted on point-of-care ultrasound, which was likely representative of a hematoma, however, this too would not explain all of his symptoms alone.

**Follow up:** The patient was reached out to at varying intervals after presentation and most recently at 10 months from initial presentation his mother reported that he was able to play varsity baseball that following spring and had just begun to develop some plantar foot pain but was otherwise able to achieve premorbid levels of activity.

**Discussion:** This case exemplifies an unusual precipitating event leading to compartment syndrome as well as a remarkable recovery from a potentially devastating diagnosis especially given the amount of time elapsed since initial injury.

It can be misleading to only consider a narrow differential diagnosis based on mechanism of injury alone, especially if all of the symptoms are not explained by the leading differential. Expanding to a broad working differential diagnosis is important; taking into account a differential based off presenting symptoms as well as the mechanism of injury. When considering a wider range of plausible diagnoses, a physician can begin ruling out conditions with serious sequelae, such as compartment syndrome as in this case.

## References:

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3. Sheridan GW, Matsen FA 3<sup>rd</sup>. (1976). Fasciotomy in the treatment of the acute compartment syndrome. *American Journal of Bone Joint Surgery*, 58(1), 112.