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## ***Slater-Harris Fracture in High School Softball Player***

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### ***OBJECTIVE***

The objective of this case study is to raise awareness about consideration of growth plate injuries when diagnosing adolescent patients, as well as to highlight how those injuries can present themselves.

### ***MEDICAL HISTORY/ BACKGROUND***

The patient is a fifteen-year-old, female softball player. No previous acute or chronic injuries to the left leg were reported prior to this case. The patient was playing defense when another athlete collided with her while sliding into a base. The impact produced a valgus force to the patient's left leg. The patient stated that it felt as if her knee "gave out" on her as she fell to the ground. Chief complaint was moderate, sharp pain and tenderness along the medial aspect of the knee. The patient presented with immediate edema, and loss of range of motion (ROM) due to pain. Active and passive ROM were not within normal limits, as the patient could not perform knee flexion past 90 degrees. She also complained of difficulty to bear weight at the time and was taken into the athletic training room by wheelchair for further evaluation. The patient presented with a positive valgus stress test with no end feel on the left side when compared bilaterally. Varus Stress Test, Anterior Drawer, Posterior Drawer, and Lachmans Test were also all completed during the initial evaluation. Results of these special tests were negative but questionable due to edema, pain and muscle guarding from the patient. No neurological deficits were noted at the time. Though the athletic trainer was not able to make a positive diagnosis, she suspected a third-degree medial collateral

ligament (MCL) tear. The patient was referred to urgent care right away for radiography to ensure no other involvement of surrounding structures.

### ***DIFFERENTIAL DIAGNOSIS***

Other possibilities of this case included anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), or meniscus involvement. The diagnosis revealed after MRI was a type II Salter-Harris fracture of the distal femur. The fracture line passed through the physis (growth plate) and continued superiorly at an angle through the lateral metaphysis.

### ***RELATED LITERATURE***

Previous research supports the athletic trainers thought process during initial evaluation. It has been stated that majority of MCL injuries result from a direct blow to the outer aspect of the lower thigh or upper leg.<sup>1</sup> This is consistent with the mechanism of injury in this case. Related studies also report that pain is found to be worse in incomplete tears than complete tears, supporting the fact that the patient's pain was not very severe upon injury.<sup>1</sup> Grade III or third-degree tears of the MCL are complete disruptions of the ligament. Like the present case, the severity of these tears results in consequential instability of the involved leg. Related literature proves that the athletic trainer made the right decision to send the athlete for imaging because injuries commonly seen in combination with MCL tears include anterior cruciate ligament (ACL) tears, lateral collateral ligament (LCL) tears, medial and

lateral meniscus tears, and posterior cruciate ligament (PCL) tears.<sup>1</sup> On the other hand, type II Salter-Harris fractures are the most commonly seen and account for seventy-five of physeal fractures. Previous literature has suggested that peak incidence for growth plate fractures occurs at ages 11-14.<sup>2</sup> It has also reported that seventy-six percent of patients with complete MCL tears could walk into the office unaided without any support, contradicting what took place in the present case.<sup>1</sup> Though not considered often during an initial evaluation, growth plate fractures are not uncommon and are serious injuries.<sup>3</sup> Complications of physeal damage can include growth arrest, limb length discrepancy, and angulation of the bone.<sup>2,3</sup> Salter and Harris proposed that ten percent of patients with growth plate injuries would have limitation of growth, but in the distal femur, other authors and researchers have reported higher rates.<sup>3</sup> In previous studies, type II Salter-Harris fractures are associated with a limited disruption in blood supply but an overall good outcome.<sup>2</sup>

### **TREATMENT**

The patient's treatment included emergency surgery the same day of injury due to concerns of avascular necrosis resulting from lack of blood supply. The fracture was reduced under anesthesia and two screws were placed into the patient's lateral, distal femur. The patient was immobilized in a full leg cast. This case is still active and the patient is currently restricted to a wheel chair. Eventually the patient will receive formal physical therapy to assess strength, range of motion and gait training.

### **UNIQUENESS**

This case is unique because of how the injury presented itself during initial evaluation.

Salter-Harris fractures typically present with some type of deformity, more severe pain, and tenderness directly over the fracture site. When performing the valgus stress test, the athletic trainer placed one hand directly over the fracture site on the lateral side of the leg and the patient did not show any signs of apprehension.

### **CONCLUSIONS**

This young softball player was originally misdiagnosed due to a lack of typical symptoms of the pathology. This case is important to the athletic training profession because it is a good reminder to clinicians to consider growth plate involvement when evaluating pediatric patients. High school athletic trainers especially should have a strong understanding of growth plate fractures, treatment protocols and possible growth complications. It should be stressed that patients with growth plate fractures should be followed clinically and radiologically for at least a few years after injury and preferably until skeletal maturity. This case report will challenge clinicians to consider age when evaluating patients and aide in diagnosing injuries predisposed by age.

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**KEY WORDS:** *growth plate, Salter-Harris, type II, femoral fracture*