

CASE REPORT

Salter-Harris Type 1 Fracture of the Left Fibula in a 5-Year-Old Girl after Trampoline Injury

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ABSTRACT

This case report describes a Salter-Harris type 1 fracture of the left fibula in a 5-year-old girl who sustained the injury while jumping off a trampoline. Growth plate injuries, like this Salter-Harris type 1 fracture, are common in the pediatric population, especially among young children participating in recreational activities. The patient presented with immediate pain, swelling, and inability to bear weight on the affected ankle. Radiographic imaging confirmed the Salter-Harris type 1 fracture, characterized by a fracture line through the growth plate with the epiphysis remaining in its normal position. The patient was treated with immobilization in a short leg cast, instructed to avoid weight-bearing, and underwent a structured rehabilitation program. With appropriate management, the patient was able to return to her normal physical activity level without any residual issues. This case highlights the importance of early recognition and prompt treatment of growth plate injuries in children to ensure a full recovery.

Keywords: Salter-Harris, fractures, pediatric injuries, ankle injury, management of pediatric fractures.

INTRODUCTION

Growth plate (physeal) injuries are common in the pediatric population, especially among young children participating in recreational activities involving jumping and landing. Salter-Harris type 1 fractures, characterized by a fracture line through the growth plate with the epiphysis remaining in its normal anatomical position, are among the most frequently encountered growth plate injuries. This case report describes the presentation and management of a Salter-Harris type 1 fracture of the left fibula in a 5-year-old girl who sustained the injury while jumping off a trampoline.

CASE PRESENTATION

A 5-year-old girl presented to the emergency department after sustaining an ankle injury while jumping off a trampoline at home. The patient reported immediate pain, swelling, and inability to bear weight on the left ankle. Physical examination revealed tenderness over the lateral aspect of the left ankle, with mild soft tissue swelling. Radiographic imaging of the left ankle joint showed slight irregularity and asymmetry of the growth plate of the left fibula, suggesting a Salter-Harris type 1 injury. Additionally, there was slight irregularity along the superior aspect of the calcaneal apophysis and mild soft tissue swelling around the left ankle joint (Fig. 1 and 2).

Radiographic Findings



Fig. (1): Anteroposterior view of the ankle demonstrating Salter-Harris type 1 fracture.



Fig. (2): Lateral view of the ankle demonstrating fracture through the epiphyseal growth plate.

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Fig. (3): Anteroposterior view of left ankle after 4 weeks post healing.



Fig. (4): Lateral view of left ankle after 4 weeks.

Management and Outcome

The patient was diagnosed with a Salter-Harris type 1 fracture of the left fibula and was treated with immobilization of the left lower extremity in a short leg cast. She was instructed to avoid weight-bearing on the affected limb and was prescribed pain medication as needed. Serial radiographic assessments were performed to monitor the healing of the growth plate.

Rehabilitation and Return to Physical Activity

After 4 weeks, the cast was removed, and the patient was referred to physical therapy for a structured rehabilitation program. The physical therapy goals included regaining the full range of motion in the left ankle and subtalar joints, restoring muscle strength and proprioception in the left lower extremity, improving balance and coordination, and gradually transitioning the patient back to weight-bearing activities.

The rehabilitation program consisted of gentle range of motion exercises, isometric and progressive resistive exercises, balance and proprioceptive training, and a gradual progression to low-impact activities. Once the patient demonstrated full range of motion, adequate strength, and good neuromuscular control, she was cleared to gradually return to her normal physical activities, including playing on the trampoline, under close supervision. Ankle X-ray done at 6 weeks showed complete healing of the fracture (**Fig. 3 and 4**).

At the 3-month follow-up, the patient had regained full range of motion and strength, and radiographic imaging showed complete healing of the growth plate without any evidence of growth disturbance. She was able to resume her normal physical activity level without any residual issues or limitations.

DISCUSSION

Salter-Harris fractures, also known as physeal fractures, are a type of bone fracture that specifically occur in the growth plate (physis) of children's bones. The Salter-Harris classification system is used to categorize these fractures based on the involvement of the physis, metaphysis, and epiphysis. This classification is crucial as it has important implications for the prognosis and treatment of these injuries. Additionally, the Salter-Harris system facilitates effective communication among healthcare providers when discussing these pediatric fractures [1-4].

Epidemiology of Salter-Harris Fractures

The growth plate, or physis, is a region of cartilage present in developing bones. This physis gradually closes as children mature, with the process occurring at varying ages.

Salter-Harris classification of physeal fractures

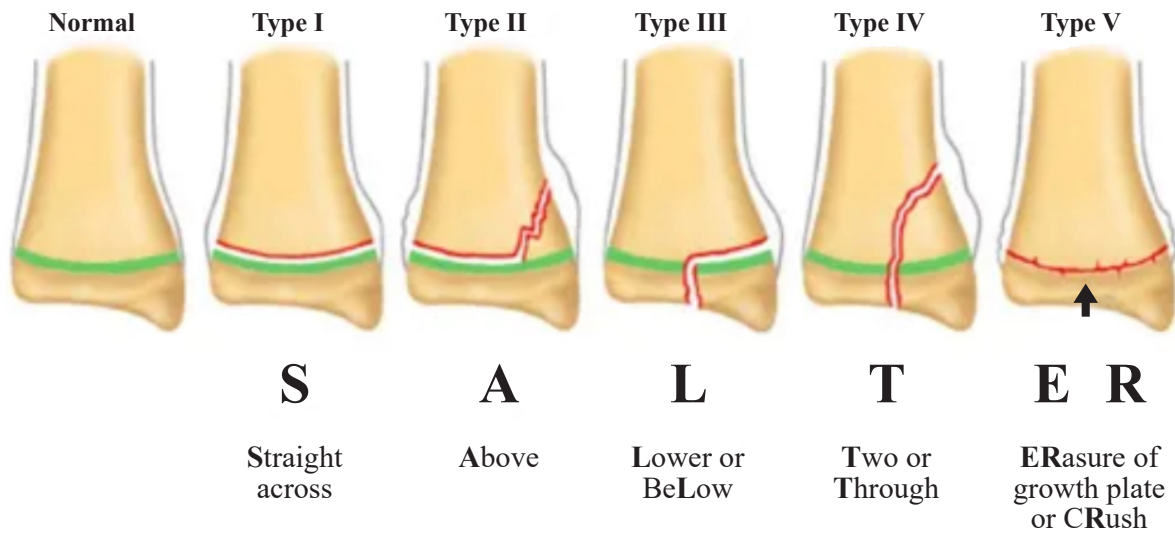


Fig. (5): Classification of Salter-Harris fractures [8].

Injuries to the growth plate are quite common in children, accounting for 15-30% of all bony injuries in this population. Salter-Harris fractures are a specific type of growth plate injury that occurs exclusively in children, as they do not occur in the fully developed bones of adults.

The SALTER mnemonic can be used to remember the first five types of the growth plate (physeal) fractures. This mnemonic requires visualizing the bones as long bones, with the epiphyses (ends) at the base [5].

I. Slip (S) fracture: This is a fracture of the cartilage in the growth plate, which separates or goes straight across.

II. Above (A) fracture: The fracture line is above the growth plate, away from the joint.

III. Lower (L) fracture: The fracture is below the growth plate, in the epiphysis (end of the bone).

IV. Through Everything (TE) fracture: The fracture extends through the metaphysis (middle part of the bone), growth plate, and epiphysis.

V. Rammed (R) or Crushed fracture: The growth plate has been crushed.

Among the different types of Salter-Harris fractures, type II is the most prevalent, representing around 75% of cases. This is followed by types III and IV, each accounting for approximately 10% of cases. Type I fractures are less common, making up about 5% of Salter-Harris injuries. Finally, type V fractures are very rare and are typically diagnosed retrospectively [6].

Boys are more likely to sustain growth plate injuries compared to girls. This is likely due to boys' increased

tendency to engage in high-risk physical activities. Additionally, girls tend to experience these injuries at a younger age, typically between 11-12 years old, whereas boys are more commonly affected between 12-14 years of age [7]. Classification of Salter-Harris fractures is shown in Fig. (5) [8].

Outcomes

The time it takes for a child to fully recover and return to their normal physical activities after a growth plate injury can vary considerably, typically ranging from 2-12 months depending on several key factors. More severe injuries, such as Salter-Harris type III or IV fractures, generally require longer recovery periods of 6-12 months compared to less severe type I or II fractures, which may heal within 2-4 months [9]. The location of the growth plate injury also plays a role, with injuries to the distal femur, proximal tibia, or distal radius often taking longer to recover than those affecting the fibula or ulna. Moreover, younger children tend to heal faster than older children or adolescents, as their growth plates are more active [10]. Regardless of the specific injury, adherence to the prescribed treatment and rehabilitation plan is crucial for promoting proper healing and a successful return to normal physical activities. This includes a period of immobilization followed by a gradual progression of weight-bearing, range-of-motion exercises, strengthening, and sport-specific training under the guidance of a physical therapist. Rushing the return to high-impact activities too soon can increase the risk of re-injury or long-term complications, so close monitoring by the healthcare team is essential.

Complications

Salter-Harris fractures in children require close follow-up to monitor for common complications, including growth disturbances, angular deformities, joint stiffness, avascular necrosis, post-traumatic osteoarthritis, and physeal bar formation [11]. Early recognition and appropriate management of these complications are crucial to prevent long-term issues and optimize the child's functional outcomes. Clinicians should be vigilant in monitoring for these complications through regular clinical and radiographic assessments, and be prepared to implement timely interventions, such as physical therapy, corrective osteotomies, or growth modulation procedures, to address any arising problems and ensure the best possible outcomes for their young patients.

CONCLUSION

This case demonstrates the importance of recognizing and promptly managing Salter-Harris type 1 fractures in young children participating in recreational activities. With appropriate treatment and a structured rehabilitation program, most patients with this type of growth plate injury can achieve a full recovery and return to their previous level of physical activity.

CONSENT FOR PUBLICATION

Informed consent was obtained from the participants for this study.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Declared none.

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