American Journal of Clinical Case Reports

ISSN: 2766-5844

Case Report

Displaced Proximal Humerus Fracture in an Adolescent Following a Rugby Injury

Shaza Ali, Humayun Hijazi and Eoin Sheehan*

Midland Regional Hospital Tullamore, Ireland

Abstract

A teenage boy was referred with a proximal humerus fracture after he injured his shoulder when participating in a rugby match. The initial imaging studies did not show the fracture but subsequent x-rays showed a displaced fracture with varus angulation across the growth plate with concerns for growth distortion in the future. Due to the displacement of the fracture at the growth plate, closed reduction and percutaneous pinning were advised to regain the proper alignment and avoid growth plate damage and subsequent deformity. The patient was advised to immobilize the shoulder for three weeks after the surgery, the patient was given structured physiotherapy to facilitate easy shoulder movement. Subsequent examination confirmed union of the fractured ends, full range of motion was regained of the affected limb, and the patient was back to exercising within 10 weeks of surgery. This case illustrates the role of repeated imaging in diagnosis and the need for early surgery in cases of displaced fracture as well as the need for specific rehabilitation plan as cornerstone in managing adolescent shoulder injuries.

Keywords: Proximal humerus; Surgery; Rehabilitation; Shoulder injuries

Introduction

Fractures of the proximal humerus across growth plates pose a particular concern in the adolescent population because these injuries carry a high likelihood of worst-case outcome if not addressed correctly [1]. Teenagers are especially sensitive to these injuries, especially in active, contact sports where hyperextension or direct impact can occur [2]. While there is a high degree of bony remodelling around the Physis, severely displaced/angled fractures may not unite satisfactorily without operative intervention [3]. This case shows the significance of correct diagnosis, surgical intervention on schedule, and an organized rehabilitation program to reduce or minimize the long-term consequences and assist the patient in returning to his usual activities, pointing out the significance of individualized adolescent orthopaedic injuries' treatment [4].

Case Presentation

A male patient in his late teens presented to the orthopaedics clinic for follow-up after sustaining an injury to his left shoulder during a rugby match. He described the incident where he was tackled and experienced a hyperextension injury to his left arm. Immediately following the injury, he reported sharp pain and was subsequently taken to a regional hospital, where a proximal humerus fracture was suspected however it was not detected on imaging. He presented to our orthopaedics clinic for a repeat x-ray and further evaluation of the injury the following day.

The patient does not have any significant medical history and is otherwise healthy. There is no known family history of musculoskeletal disorders or injuries. His social history is unremarkable, with no known history of alcohol, tobacco, or drug use. The patient is physically active, participating regularly in sports such as rugby. His injury occurred during routine sporting activity, and there are no other contributory lifestyle factors to note.

On clinical examination, the patient's axillary nerve was intact, with normal sensation, as were his median, radial, and ulnar nerves, both motor and sensory. There was no evidence of other systemic or neurological conditions affecting his function. No additional medical abnormalities were observed during the examination.

A repeat x-ray was performed, revealing a displaced fracture of the proximal humerus with varus angulation as seen in Figures 1-3. The fracture appeared to be a salter Harris type 5, raising concerns about potential long-term deformity due to the injury's proximity to the growth plate, particularly given the patient's age and skeletal maturity.

The patient was reviewed by the attending orthopaedic consultant, who explained that the injury was a growth plate fracture, which, if left untreated, could result in residual angular deformity of the proximal humerus due to his nearing skeletal maturity. Given the risk of permanent deformity, surgical intervention was recommended. The plan for management involved an attempt at closed reduction of the fracture with percutaneous pinning. However, the consultant noted that if satisfactory reduction could not be achieved, an open reduction would be necessary. The patient and his parent were informed of the risks associated with the procedure, including the potential need for anesthesia, the possibility of nerve or vessel injury, a 1% risk of infection, and the risk of hardware complications.

- Little league Shoulder
- Salter-Harris Type II Fracture
- Osteochondritis Dissecans
- Stress Fracture of the Physis

Final diagnosis : salter-harris type 5

Citation: Ali S, Hijazi H, Sheehan E. Displaced Proximal Humerus Fracture in an Adolescent Following a Rugby Injury. Am J Clin Case Rep. 2025;6(3):1105.

Publisher Name: Medtext Publications LLC

Manuscript compiled: Jul 04th, 2025

***Corresponding author:** Shaza Noureldin Omer Ali, Midland Regional Hospital Tullamore, Tullamore, Co. Offaly, Ireland, Tel: +353 89 269 2775

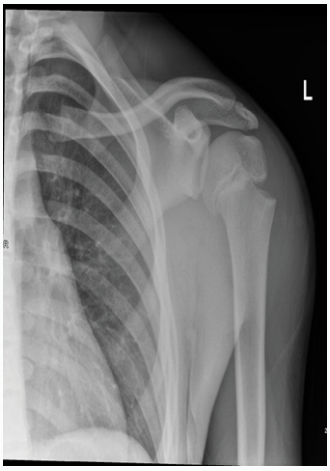

Figure 1: AP view x-ray of left shoulder.

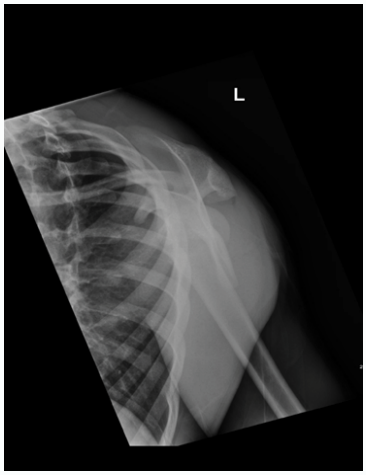

Figure 2: Lateral view x-ray of left shoulder.

Figure 3: Superior- inferior axial x-ray view of left shoulder.

In a case of such displacement and Varus angulation then surgery intervention is required in fracture management. The plan is to do a closed reduction with pinning as shown in Figure 4 and 5, with open reduction being an option if acceptable alignment was not achieved.

Surgery for this case would be correction of the angulation of the fractured humerus, application of pins to facilitate growth and to also counter check angulations as the growth plate of the shaft closes. Afterward, the patient would require physiotherapy that involves mobilisation around the shoulder joint for muscle strength.

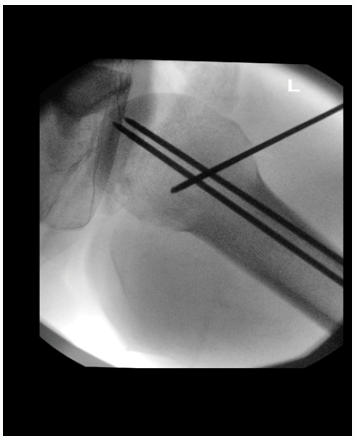

Figure 4: superior- inferior axial x-ray view of left shoulder post k-wiring.

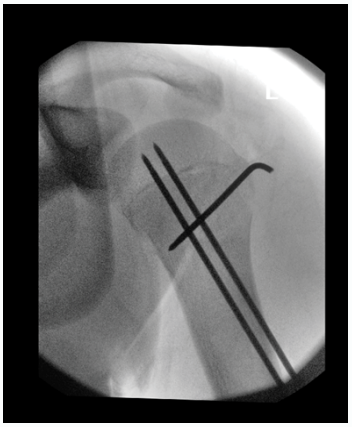

Figure 5: AP view x-ray of left shoulder post k-wiring.

Use of a sling or shoulder immobiliser is mandatory in the initial Months after surgery to prevent any types of motion that may cause the fracture to shift. The period for which the affected limb will be immobilized may be long due to the callus formation, which generally takes 3- 4 weeks.

- 1-week follow-up: for the pin track review and to ensure no signs infection.
- 4-week follow-up: X-ray to check the healing process and the alignment of the fracture.
- 8-week follow-up: K-wires were removed successfully, and there was no limitation in the range of motion of the shoulder in the patient. The fracture has healed in satisfactory position as demonstrated in Figure 6 and 7. It was then recommended that the patient should refrain from contact sports for an additional two weeks making the total to 10 weeks. He was allowed to go back to the gym and from there he could raise the intensity as he felt like.

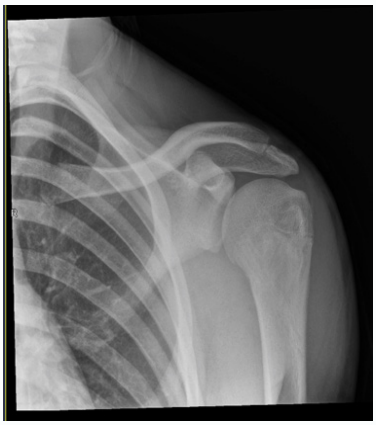

Figure 6: AP view x-ray post removal of k wires.

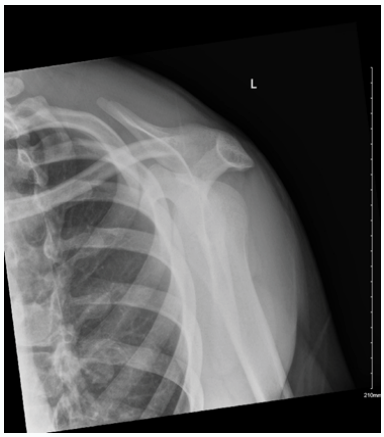

Figure 7: Lateral view x-ray of left shoulder post removal of k wires.

Discussion

This real-life case of a proximal humerus fracture in a male adolescent, resulting from a rugby incident, brings into focus broad principles on the treatment of adolescent skeletal injury [5]. Proximal Humerus fractures in children and adolescent are relatively uncommon, contribute with 3% of all bone fractures in children/adolescents and most often caused by high energy activities such as sports injuries [6]. The mechanism of injury is hyperextension because of a tackle is typical of these high-impact scenarios.

The proximal humerus in paediatric patients has a high capacity for remodelling due to the presence of the proximal humeral physis (growth plate), which remains open until late adolescence, this physis also contributes about 80% of the overall humeral length, making an injury to this area at a young age possibly more consequential but also allowing extensive remodelling of acute fractures [7]. Surgical fixation was warranted in this case although standard care for growth plate injuries does not require surgical management especially in the paediatric patients with proximal humerus fractures; however, displacement and varus angulation were apparent in the current presentation of the patient. It is with this background that the Salter-Harris classification of growth plate injuries is useful in advising prognosis and management. In this case, surgery was needed because of the threat of developing permanent deformity because of the growth plate injury [5-7].

Current guidelines and treatment pathway:

For minimally displaced fractures of proximal humerus in children, the consensus is to treat conservatively as these are quite likely to remodel as the child grows. Nevertheless, surgical management is recommended in cases where there are marked displacement and angular malalignment, and in cases where the fracture does not progress towards healing appropriately. This approach has been shown to yield good functional outcomes in children and adolescents with displaced proximal humerus fractures [9].

Similar published cases

There have been multiple reports of proximal humerus fractures in adolescents associated with sports injuries, with outcomes like this case. a cohort of adolescent rugby players who sustained proximal humerus fractures, all treated with closed reduction and K-wiring [10]. All patient outcomes were positive and all patients were back to their pre-injury level of activity within 8-12 weeks [8]. In this case, follow up depicted full regaining of shoulder joint movements and healed wounds to those depicted in this study.

Follow-up and rehabilitation

In this case, at 8 weeks post-operation, K-wires were removed and the patient began deferring contact sports before returning to full sports activity. Physiotherapy was very significant for the shoulder because immobilization results in stiffness and shoulder muscles' weakness. The follow-up care plan for a patient with such an injury can be summed up as a progressive graduated musculoskeletal rehabilitation process to help the patient regain both muscle strength and flexibility and especially reduce factors that can lead to complications like adhesive capsulitis or the development of complications that would lead to persistent deformity.

Conclusion

The case presented in this paper provides information on the role of early intervention and proper surgery for proximal humerus fractures in children involving the growth plate. Due to early diagnosis, treatment through surgical intervention and specific physiotherapy, the operation resulted in positive outcome, and the patient was able to regain normal level of physical activity. This standard of practice is in accordance to the current literature for the treatment of displaced fractures in adolescent and affirms the efficiency of percutaneous fixation in such cases. However, the patient and the caregiver should remain vigilant for possible late sequelae such as growth abnormality or angular deformity if the growth plates are open in the patient.

References

1. Lefèvre Y, Journeau P, Angelliaume A, Bouty A, Dobremez E. Proximal humerus fractures in children and adolescents. Orthop Traumatol Surg Res. 2014;100(1 Suppl):49-56.
2. Micheli LJ, Klein JD. Sports injuries in children and adolescents. Br J Sports Med. 1991;25(1):6-9.
3. Shore BJ, Hedequist DJ, Miller PE, Waters PM, Bae DS. Surgical management for displaced pediatric proximal humeral fractures: a cost analysis. J Child Orthop. 2015;9(1):55-64.
4. Kaeding CC, Whitehead R. Musculoskeletal injuries in adolescents. Prim Care. 1998;25(1):211-23.
5. Binder H, Schurz M, Aldrian S, Fialka C, Vécsei V. Physeal injuries of the proximal humerus: long-term results in seventy two patients. Int Orthop. 2011;35(10):1497-502.

6. Neer CS, Horwitz BS. Fractures of the proximal humeral epiphysial plate. Clin Orthop Relat Res. 1965;41:24-31.

7. Laer L. Verletzungen des Schultergürtels und des Humerusschaftes. In: Frakturen und Luxationen im Wachstumsalter. Stuttgart: Thieme; 2007:105-10.

8. Abbot S, Proudman S, Ravichandran B, Williams N. Predictors of outcomes of proximal humerus fractures in children and adolescents: A systematic review. J Child Orthop. 2022;16(5):347-54.

9. Swarup I, Hughes MS, Bram JT, Horn BD, Ganley TJ. Percutaneous pinning of pediatric proximal humeral fractures. JBJS Essent Surg Tech. 2019;9(4):1-6.

10. Bhat SA, Kangoo K, Baba A, Zahoori A. Fluoroscopic-guided close reduction and percutaneous K-wire fixation of paediatric proximal humeral fractures. J Orthop Traumatol Surg Res Rev. 2019;14(2):54-9.