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Closed Reduction and Casting for a Gartland Type IIB Supracondylar Humerus Fracture in a Child: A Case Report

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ABSTRACT

The most prevalent kind of elbow fracture that occurs among kids is a supracondylar fracture of the humerus. Type IIB fractures, characterized by posterior displacement with translation/rotation but intact cortical contact, remain controversial in management. This case report describes a seven-year-old male who had a Gartland Type IIB supracondylar fracture of the humerus following a fall onto an outstretched hand and who presented with visible deformity and pain. X-rays confirmed displacement with intact cortical contact. The closed reduction technique achieved satisfactory realignment of the fracture fragments, and application of a high above-elbow cast maintained the reduction, verified by post-reduction X-rays. Weekly radiographic monitoring ensured proper positioning during the healing process. The patient achieved fracture union within 4 weeks; cast removal revealed full elbow range of motion, with no residual deformity or functional limitations at the one-year follow-up. This case aligns with findings that nonoperative treatment, when closely monitored, can yield excellent functional and radiographic results. This case highlighted the importance of appropriate fracture classification, prompt treatment, and regular follow-up to ensure optimal functional recovery in pediatric supracondylar fractures.

Keywords: *Supracondylar Humerus Fracture, Gartland Type IIB, Closed Reduction*

1. INTRODUCTION

The most prevalent kind of elbow fracture that occurs among kids is a supracondylar fracture of the humerus **(1)**. On the basis of the dislocation direction of the distal fragment, supracondylar fractures may be primarily categorized according to flexion or extension. Fractures of the extension type represent around ninety-seven percent of each supracondylar fracture of the humerus **(2)**.

The Gartland categorization is frequently utilized for assessing supracondylar humerus fractures and planning management strategies **(3)**. There are 2 kinds of management choices for Gartland type II fractures: operative and nonoperative. The status of nerve as well as vascular structures must be assessed through a neurovascular investigation, as complications involving these structures may arise following such fractures **(4)**.

Gartland categorized supracondylar fractures into type I (no dislocation), type II (posterior dislocation of the distal fragment with no posterior hinge disruption), & type III (full dislocation) **(5)**. Wilkins modified this categorization by separating type II fractures into IIA (posterior dislocation alone) as well as (dislocation plus rotation/distal fragment translation) **(6)**.

A rising body of literature addresses the management of advantages and risks associated with operative and nonoperative treatment of Gartland type II fractures. Nevertheless, the favored management modality is still controversial **(7)**. Some stated a greater probability of compartment syndrome in addition to diminished range of motion (ROM) after nonsurgical management; others stated satisfying radiological and clinical results with no subjection of the case to anesthetic and surgical probabilities **(8)**.

The greater risk of immediate complications, possibly limb-threatening because of the involvement of neurovascular structures, necessitates close vigilance and suitable treatment guidelines. The possible complications correlated with these fractures are cubitus varus deformity, extended loss of mobility, and social consequences for the family and the kid **(9)**.

We are reporting a case of Gartland type II B supracondylar fracture of the humerus, managed with a closed reduction and high above-elbow cast, achieving satisfactory realignment of the fracture fragments.

2. CASE PRESENTATION

A seven-year-old male case without significant prior medical history sustained a left elbow injury following a fall onto an outstretched hand. The patient presented with a visible deformity and pain of the left elbow.

Clinical and Radiographic Findings: Initial X-rays revealed a supracondylar fracture of the humerus, classified as Gartland type II B (figure 1). The imaging demonstrated displacement with maintained cortical contact, consistent with this classification.

Management: The patient was managed with a closed reduction procedure, achieving satisfactory realignment of the fracture fragments. A high above-elbow cast (figure 2) was applied to maintain the reduction. Post-reduction X-rays (figure 3) confirmed acceptable alignment. The patient underwent weekly (figures 4, 5, and 6) radiographic monitoring to ensure continued proper positioning during the healing process.

Outcome: After 4 weeks, when radiographs indicated successful fracture union in an acceptable position, the cast was removed. Subsequent follow-up revealed full restoration of the range of movement at the left elbow with no residual deformity. The patient was monitored for one-year post-injury, during which the outcome remained favorable with maintained alignment and function.

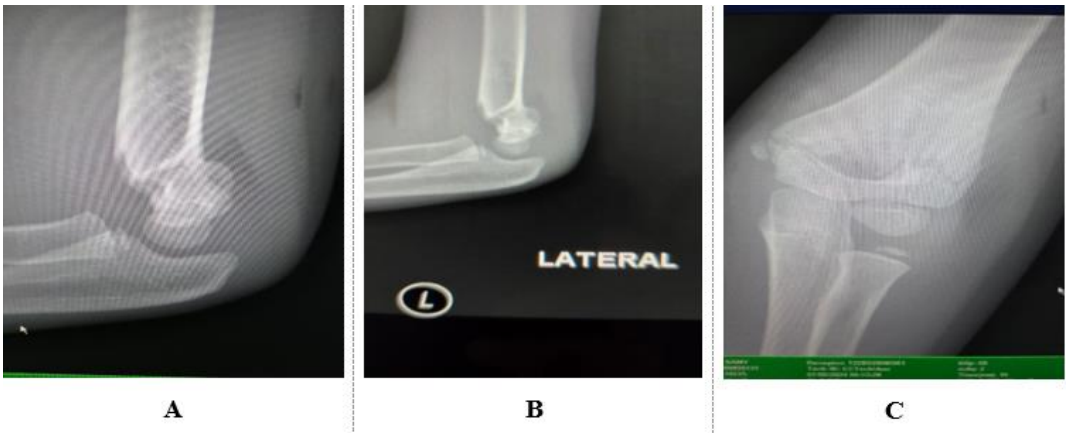

Figure 1: Initial Lateral and Anteroposterior Radiographs Demonstrating Gartland Type IIB Supracondylar Fracture of Humerus with Posterior Displacement and Intact Cortical Contact

Figure 2: A high above-elbow cast to maintain the reduction.

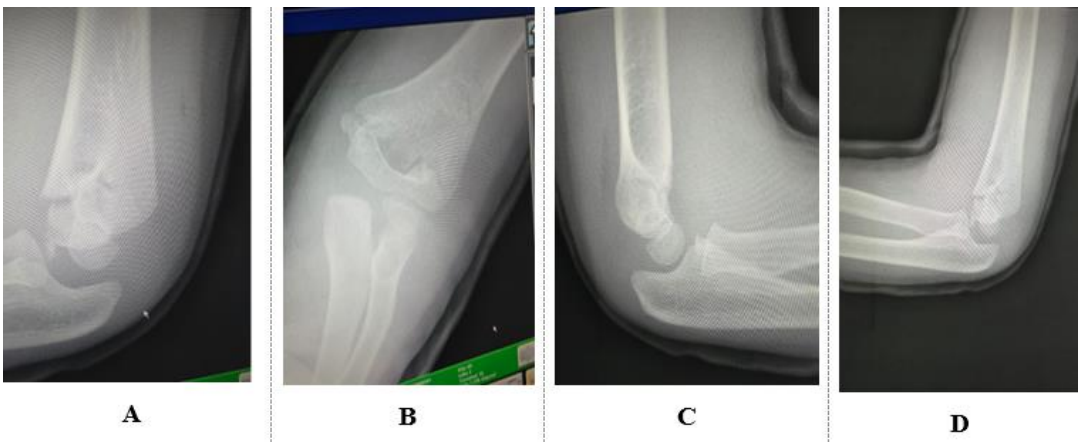

Figure 3: Post-Reduction Radiographs Showing Successful Closed Reduction and Alignment of Fracture Fragments with High Above-Elbow Cast Immobilization

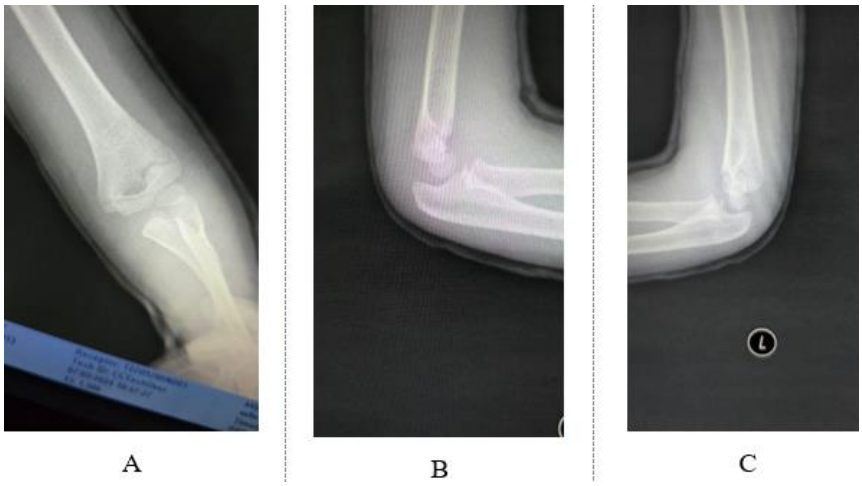

Figure 4: One-Week Follow-Up Radiographs Confirming Maintenance of Fracture Reduction and Alignment in High Above-Elbow Cast

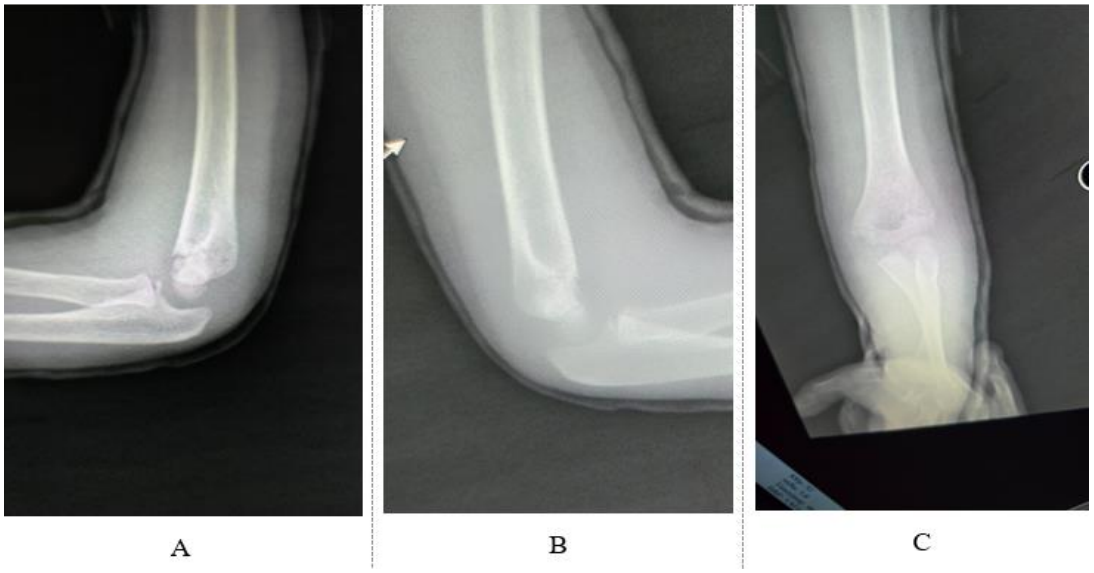

Figure 5: Two-Week Follow-Up Radiographs Demonstrating Continued Stability of Fracture Alignment During Cast Immobilization

Figure 6: Three-Week Follow-Up Radiographs Showing Progressive Healing and Sustained Alignment Prior to Cast Removal

3. DISCUSSION

There is a possibility that the supracondylar fracture of the humerus is the prevalent kind of fracture that occurs around the elbow in kids. The stated occurrence is around three percent of every fracture in kids and around sixty percent of every elbow fracture **(10)**. The fractures happen following a fall onto the outstretched hand with the elbow in full extension, happening in ninety-seven to ninety-nine percent of patients with extension-type injuries **(11)**.

This case presented a seven-year-old male who had a Gartland Type IIB supracondylar humerus fracture after falling on an outstretched hand and presented with pain and visible deformity. X-rays confirmed displacement with intact cortical contact. The closed reduction technique achieved satisfactory realignment of the fracture fragments, and application of a high above-elbow cast maintained the reduction, verified by post-reduction X-rays. Weekly radiographic monitoring ensured proper positioning during the healing process. The patient achieved fracture union within 4 weeks; cast removal revealed full elbow range of movement, with no residual deformity or functional limitations at the one-year follow-up.

Percutaneous pinning and closed reduction are generally considered the standard management for dislocated supracondylar humerus fractures in kids, including Gartland type II fractures **(12, 13).**

Casting and closed reduction produce excellent radiographic and functional results without resulting in operative complications and anesthetic complications like pin-site, iatrogenic neurovascular injury (ulnar nerve), or scars and infections of the bone **(14)**. It was reported that pinning and closed reduction of every Gartland type II fracture would have led to seventy-seven percent of cases undergoing an unnecessary procedure, consequently recommending that orthopedic management must be utilized as the primary management of these fractures **(15)**.

In line with **Sisman et al., (16)** discuss that results for non-operative managed type IIb fractures are similar to those of conservatively treated type IIa fractures. Their research demonstrated satisfactory management results for every type II supracondylar humerus fracture when the reduction is still stable throughout the 1st week after casting and closed reduction. Seriously, no cases of reduction loss have been noticed following the 1st week. As well, **Cekanauskas et al., (17)** reported that Type II as well as Type III supracondylar humerus fractures may be managed satisfactorily with closed reduction and external immobilization, as a plaster cast.

Moreover, **Ojeaga et al., (18)** reported that there were seventy-seven elbows managed with closed reduction and extended splint or cast immobilization. Of those closed reductions, 76.62 percent of elbows (59/77) sustained their reduction alignment and didn't need operative management for percutaneous pinning.

Furthermore, **Zhu et al., (19)** who supported the utilization of conservative treatments for Gartland Type II fractures, stating that it is safe and effective and results in a quicker recovery period of elbow range of movement when compared to operative management, nevertheless stated that Type IIB had a 41.3 percent risk of 2ry dislocation; nevertheless, we still favor closed reduction. Whereas, closed reduction of Garland type II should be followed precisely in the 1st two weeks to detect cases with reduction loss.

However, **Jain et al. (20)** observed a 40.62 percent loss of reduction (LOR) in type II fractures managed with casting and closed reduction.

In contrast, **Camus et al., (21)** detected that not every fracture managed with cast immobilization and closed reduction attained anatomic position and alignment at last monitoring.

In contrast, **Samaila et al., (22)** reported that a case that had a Gartland IIa fracture primarily had casting and reduction; nevertheless, at the radiographic monitoring following one week, there was proof of dislocation, resulting in an alteration to operative pinning management.

4. CONCLUSION

The patient achieved a favorable outcome with full restoration of elbow range of movement and no residual deformity. This case highlighted the importance of appropriate fracture classification, prompt treatment, and regular follow-up to ensure optimal functional recovery in pediatric supracondylar fractures.

REFERENCES

[1] Emery KH, Zingula SN, Anton CG, Salisbury SR, Tamai J. Pediatric elbow fractures: a new angle on an old topic. Pediatr Radiol. 2016; 46:61–6.

[2] Cheng JCY, Lam TP, Maffulli N. Epidemiological features of supracondylar fractures of the humerus in Chinese children. J Pediatr Orthop B. 2001;10(1):63–7.

[3] Vaquero-Picado A, González-Morán G, Moraleda L. Management of supracondylar fractures of the humerus in

children. EFORT open Rev. 2018;3(10):526–40.

[4] Turgut A, Aksakal AM, Ozturk A, Oztas S. A new method to correct rotational malalignment for closed reduction and percutaneous pinning in pediatric supracondylar humeral fractures. Acta Orthop Traumatol Turc. 2014;48(5):611–4.

[5] GARTLAND J. Management of supracondylar fractures of the humerus in children. Surg Gynecol Obstet. 1959;109(2):145–54.

[6] Wilkins KE. Fractures and dislocations of the elbow region. Fract Child. 1984;373.

[7] Booker M, Sumandea F, Swarup I, Pandya N. Nonoperative Management of Gartland Type II Supracondylar Humeral Fractures: A Comprehensive Review. Curr Rev Musculoskelet Med. 2025;1–6.

[8] Padman M, Warwick AM, Fernandes JA, Flowers MJ, Davies AG, Bell MJ. Closed reduction and stabilization of supracondylar fractures of the humerus in children: the crucial factor of surgical experience. J Pediatr Orthop B. 2010;19(4):298–303.

[9] Micheloni GM, Novi M, Leigheb M, Giorgini A, Porcellini G, Tarallo L. Supracondylar fractures in children: management and treatment. Acta Bio Medica Atenei Parm. 2021;92(Suppl 3):e2021015.

[10] Zaidman M, Eidelman M, Abu-Dalu K, Kotlarsky P. Pediatric Supracondylar fracture of the humerus with sideward displacement. Surg Tech Dev. 2023;12(3):107–18.

[11] Kiepura S, Dutka J. Gartland type III extension supracondylar humerus fracture in a 10-year-old child. A surgical case report of an infrequent technique of medial and lateral column stabilization. Int J Surg Case Rep. 2023; 113:109078.

[12] Vaquero-Picado A, González-Morán G, Moraleda L. Management of supracondylar fractures of the humerus in children. EFORT open Rev. 2018;3(10):526–40.

[13] Abzug JM, Herman MJ. Management of supracondylar humerus fractures in children: current concepts. JAAOS-Journal Am Acad Orthop Surg. 2012;20(2):69–77.

[14] Miranda I, Sánchez-Arteaga P, Marrachelli VG, Miranda FJ, Salom M. Orthopedic versus surgical treatment of Gartland type II supracondylar humerus fracture in children. J Pediatr Orthop B. 2014;23(1):93–9.

[15] Hadlow AT, Devane P, Nicol RO. A selective treatment approach to supracondylar fracture of the humerus in children. J Pediatr Orthop. 1996;16(1):104–6.

[16] Sisman A, Avci O, Cepni SK, Cullu E. Is there a chance to treat Modified Gartland type IIB Pediatric Supracondylar Humerus Fractures with closed reduction and casting? J Pediatr Orthop. 2022;42(8): e821–7.

[17] Cekanauskas E, Degliute R, Kalesinskas RJ. Treatment of supracondylar humerus fractures in children, according to Gartland classification. Med. 2003;39(4):379–83.

[18] Ojeaga P, Wyatt CW, Wilson P, Ho CA, Copley LAB, Ellis Jr HB. Pediatric type II supracondylar humerus fractures: factors associated with successful closed reduction and immobilization. J Pediatr Orthop. 2020;40(8): e690–6.

[19] Zhu D, Wen Y, Wang Q, Son B, Feng W. Conservative versus surgical treatment of Gartland type II supracondylar humeral fractures in children. J Pediatr Orthop B. 2024;33(6):568–73.

[20] Jain S, Mohan R. Closed Reduction and Casting Versus K-wire Fixation of Gartland Type II Supracondylar Fracture Humerus in Children: Radiographic Outcome and Complications. Acta Orthop Traumatol Hell. 2023;74(4).

[21] Camus T, MacLellan B, Cook PC, Leahey JL, Hyndman JC, El-Hawary R. Extension type II pediatric supracondylar humerus fractures: a radiographic outcomes study of closed reduction and cast immobilization. J Pediatr Orthop. 2011;31(4):366–71.

[22] Samaila EM, Auregli L, Pezzè L, Colò G, Magnan B. Medium-term clinical results in the treatment of supracondylar humeral fractures in children: does the surgical approach impact outcomes? J Orthop Traumatol. 2024;25(1):43.