



Mini Review

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# Description of the Pediatric Population with Supracondylar Fracture, in a High-Complexity Center



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## Summary

**Introduction:** Elbow trauma in children is the second most common cause of emergency department visits, with supracondylar fractures being the most common. Correct identification, classification, and timely intervention will reduce morbidity, as consolidation in the immature skeleton of children occurs rapidly. Plain radiography is the technique of choice, so we will seek to clarify this pathology through this review.

**Objective:** To describe the radiographic findings that allow correct identification and classification of supracondylar fractures in the elbow in pediatric patients.

**Method:** A review was performed in the PACS system of correctly and completely obtained elbow radiographs in patients under 18 years of age acquired in 2024.

**Results:** In our review, males aged 6 to 10 years, with the left elbow being the most affected, attended the emergency room 4 hours after the trauma due to persistent pain and functional limitation. The Gartland fracture Type Ia was the most common fracture, followed by type III. Conservative management was the most prevalent.

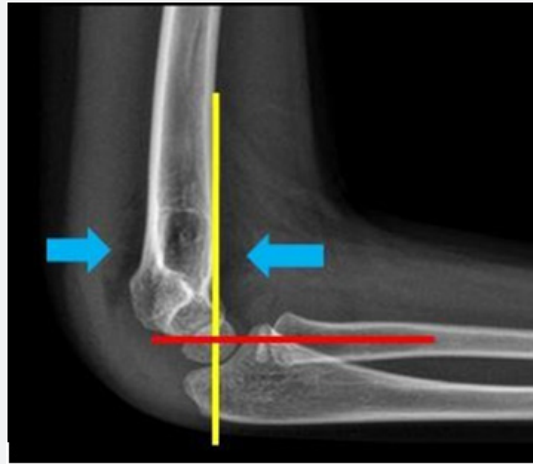
**Conclusion:** Correct identification and classification of supracondylar fractures allowed for timely intervention and short follow-up without evidence of deformity or refracture.

**Key Clinical Message:** Elbow Trauma; Supracondylar Fracture; Gartland Classification

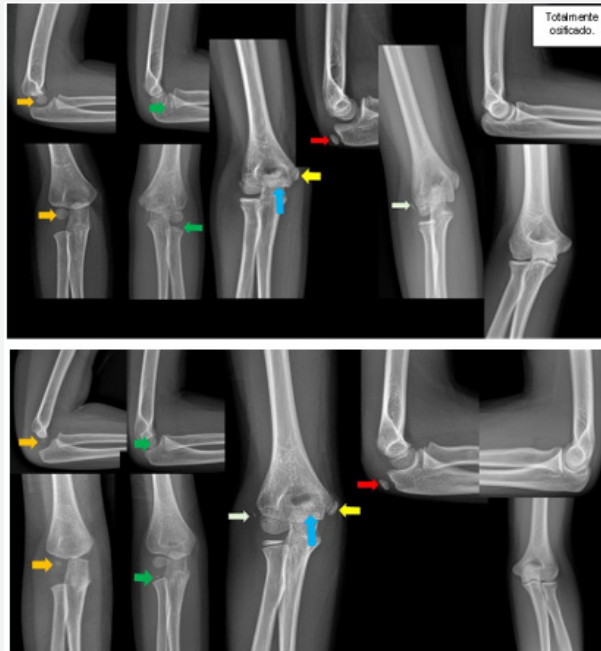
## Introduction

Elbow trauma in children is the second leading cause of emergency department visits, with supracondylar fracture being the most common diagnosis, affecting between 5 and 7 years of age [1]. Correct identification, classification and timely intervention will reduce morbidity, as consolidation in the immature skeleton of children occurs quickly. They usually affect the area most proximally to metaphysis, i.e., the hypertrophic, vascularized and provisionally calcified area with a high risk of neurovascular complications [1,2]. Clinical suspicion begins with a history of trauma in forced extension (more than 97% of cases), while the flexion type is much less common; as well as data on physical examination such as functional limitation, exclusion of the limb and edema [1,3]. The diagnosis supported by diagnostic images is made by

means of elbow radiography, which consists of anteroposterior and lateral projections, the latter being the most important and relevant in the diagnosis (Figure 1) [4]. For the imaging findings we first familiarized ourselves with the identification of the ossification nuclei, facilitated by the CRITOE menometechnics (Figure 2), (Capitellum, radius, internal epicondyle, trochlea, olecranon, external epicondyle) with their age of appearance 1-3-5-7-9-11 years, respectively [5]. Findings associated with trauma include the fat pad sign, which is defined as bulging and/or effacement of the fat pad, joint effusion, loss of joint relationship and most importantly the fracture line for subsequent Gartland classification. Complementary tomography is relieved for cases with negative radiographs and clinical suspicion as well as for surgical planning due to complexity in some cases [1,6].



**Figure 1:** Normal elbow radiograph. Lateral projection. The intersection of the anterior humeral midline (yellow) and the radiocapitellar midline (red) in the anterior third of the capitellum confirms the proper joint relationship. The fat pads should maintain their triangular morphology and homogeneous density (blue arrows).



**Figure 2:** Ossification nucleus. Top: female gender. Bottom: male gender. Lateral and anteroposterior projection of the elbow. Capitellum (yellow arrow). Radius (green arrow). Internal condyle (yellow arrow). Trochlea (green arrow). Olecranon (red arrow). External condyle (blue arrow).

## Results

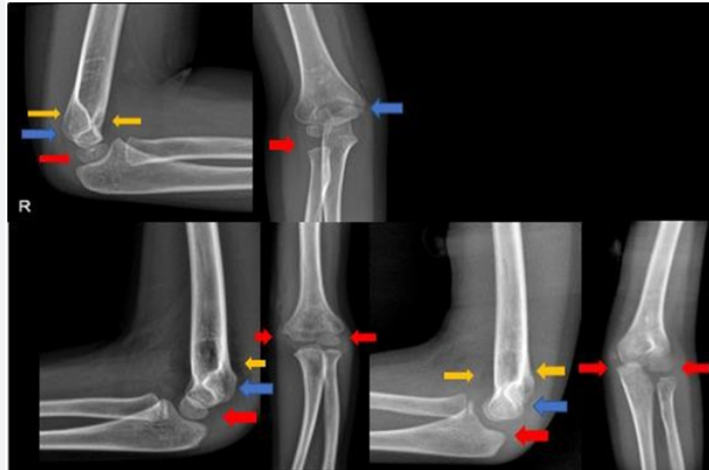
A deliberate search was carried out in the PACS for elbow X-rays with supracondylar fracture performed on patients of any gender aged 2 to 18 years between January 2024 and February 2025, obtaining 150 patients, where men with an age range between 6 and 10 years (mean 7 years) and the left elbow (70%) were the most affected, they attended the emergency room 4 hours after the trauma due to persistent pain, with a maximum of 12 hours. The Gartland fracture Type Ia was the most common fracture, followed by type III. Conservative management was the most prevalent.

## Discussion

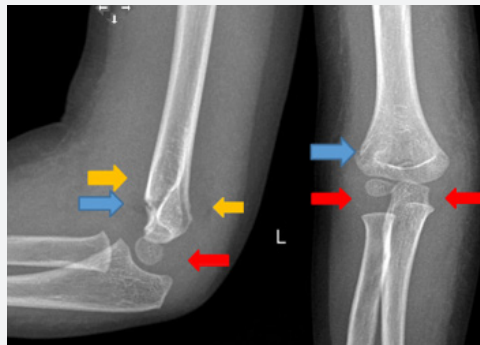
Upper extremity injuries are estimated to account for 65% of all fractures in children. The modified Gartland classification system for supracondylar fractures includes non-displaced type I, where the fracture line or fat pad sign is seen on the lateral radiograph (Figure 3) [5-8]. Gartland I supracondylar fracture. Top: Female, 2 years old. Bottom: Male, 7 years old, initial elbow radiograph and 20-day follow-up. Lateral and anteroposterior elbow radiograph. Incomplete fracture at the posterior humeral border (blue arrow) associated with joint effusion (red arrow), widening and effacement of the posterior fat pad (yellow arrow). Type II shows moderate

displacement, where the posterior cortex remains in continuity (IIa without rotation, IIb rotation). (Figure 4) [2,3,8]. Type III shows complete displacement (Figure 5) and type IV is unstable in flexion/extension (intraoperative evaluation). Elbow radiograph, lateral and anteroposterior projection. Posteriorly displaced Gartland III supracondylar fracture (←). The fat pads are elevated (←)

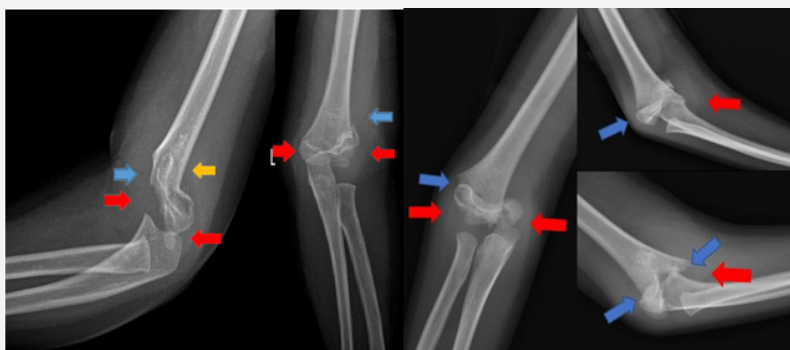
→). Joint effusion (←) on the left. Early correction prevents valgus deformity of the ulna as well as biomechanical alterations of the elbow. Management includes, for the most part, conservative (closed reduction) and surgical, which includes reduction and fixation with osteosynthesis material (Figure 6) [4].



**Figure 3:** Gartland I supracondylar fracture. Top: Female, 2 years old. Bottom: Male, 7 years old, initial elbow radiograph and 20-day follow-up. Lateral and anteroposterior elbow radiograph. Incomplete fracture at the posterior humeral border (←) associated with joint effusion (←), widening and effacement of the posterior fat pad (→).



**Figure 4:** Femenina, 5 años con trauma directo en codo. Radiografía de codo, proyección lateral y anteroposterior. Fractura supracondílea de Gartland II con desplazamiento posterior (←). Las almohadillas grasa están elevadas y borradas (→). Derrame articular (←).



**Figure 5:** Right. 5-year-old male with direct trauma to the elbow after falling from the ramp. Elbow radiograph, lateral and anteroposterior projection. Posteriorly displaced Gartland III supracondylar fracture (←). The fat pads are elevated (→). Joint effusion (←) on the left.



**Figure 6:** Right. 2-year-old male. Left. 5-year-old male with a Gartland II supracondylar fracture. Anteroposterior and lateral projections of the elbow in different patients. The fracture lines are shown aligned and secured with Kirschner pins.

## Conclusion

Correct identification and classification of the supracondylar fracture allowed for timely intervention and short follow-up without evidence of deformity or refracture.

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