# Cutaneous Manifestations in the Fingertips After a Supracondylar Humerus Fracture in a 6-Year-Old Girl: A Case Report

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## ABSTRACT

A 6-year-old girl jumped from a swing and fell on her left arm, presenting to our clinic with a supracondylar fracture of the distal humerus. The child underwent closed reduction and percutaneous pinning. At 3-week follow-up, anterior interosseous nerve palsy was noted with concurrent manifestations in the median nerve distribution. Our patient was treated nonoperatively; at 8-week follow-up spontaneous resolution of cutaneous and motor symptoms was observed. Healthcare professionals should be aware that cutaneous lesions may develop after injury to the median nerve of the proximal forearm, which can result from supracondylar humerus fractures.

***Keywords:*** Cutaneous Lesions, Humerus, Bone Fractures, Child, Median Nerve

## INTRODUCTION

Fractures of the distal humerus above the epicondyles, also called supracondylar fractures, are classified into two types. The classification depends on displacement of the distal fragment, flexion type, and extension type.[1] These fractures are commonly seen in children aged 5 to 8 years,[2] occurring after falling on outstretched hands and forced hyperextension of the elbow. Symptoms include swelling, pain, and limited range of elbow motion.[2] Findings of radiographic evaluation and further categorization of the injury can help determine appropriate treatment.[1]

Early complications of supracondylar fractures include damage to the anterior interosseous nerve (AIN) branch (ie, median nerve) and vascular injuries. Malunion can occur in the later period after the injury.[3] To our knowledge, no studies have noted cutaneous manifestations in the median-nerve distribution from proximal lesions after supracondylar fractures. We present a 6-year-old child in whom closed reduction and percutaneous pinning for treating a supracondylar fracture led to AIN palsy and blistering of skin in the median nerve distribution.

## CASE REPORT

A 6-year-old girl presented to our clinic with a supracondylar fracture of her left upper extremity. She had leapt from a swing, fell about 6 ft (1.8 m) onto her elbow, and was admitted to an outside facility for treatment of her left elbow. Radiographic findings revealed a supracondylar fracture of her left upper extremity, with complete displacement of the distal humerus (Figure 1). She was transferred to our hospital for definitive treatment. On clinical examination, she had intact motor and sensory neurological functions and no symptoms of AIN palsy.

The patient was taken to the operating room and underwent closed reduction and percutaneous pinning. She was discharged with intact neurological function of her left hand. At 1-week follow-up, AIN palsy was noted with inability to flex the interphalangeal (IP) and distal


***Figure 1.*** Lateral radiograph of left elbow from an outside facility, showing a posteriorly displaced distal humerus fracture.

***Figure 2.*** At 4 weeks postoperatively, ulcerations are visible on the volar aspect of the thumb, index, and middle fingers in the median nerve distribution.

IP joints of the thumb and index finger. She had normal levels of sensation in the median nerve distribution. At 3 weeks postoperatively, the pins were removed from her left upper extremity. The patient's mother was informed that AIN palsy was discovered and that the deficit would be monitored closely.

At 3 and 4 weeks postoperatively, symptoms of AIN palsy were still persistent. At both follow-ups, the capillary refill time was brisk at less than 3 seconds, no evidence of vascular compromise was noted, and results of a two-point discrimination (≤ t5 mm) test revealed an intact sensation in the elbow. Although no history of injuries or burns was reported, the patient had blistering in the middle, index, and thumb fingertips on the volar aspect of her left hand. At 4 weeks postoperatively, the punctate blisters were healing (Figure 2).

At nearly 8 weeks postoperatively, we noted dry skin in the median nerve distribution and complete healing of the lesions (Figure 3). The patient's parents reported that the blistering had resolved about four days earlier. The patient was able to flex and fully extend the IP joint of her thumb and form an "OK" sign, by opposing her thumb to the tip of her index finger (Figures 4A and 4B). Strength required to hold the sign was mildly limited; otherwise, sensation remained intact in the median nerve distribution.

At about 14 weeks postoperatively, the patient continued to show improvements in strength. She was able to hold an "OK" sign and had full grip strength

***Figure 3.*** At 8 weeks postoperatively, ulcerations on volar aspects of thumb, index, and middle fingertips of left hand are healed.



***Figure 4.*** A) At 8 weeks postoperatively, patient is able to flex interphalangeal joint of thumb. B) She can also oppose her thumb to the tip of her index finger, with strength required minimally limited.

comparable to the uninjured hand. She also had full range of motion and intact sensation to light touch in all digits. Because the patient regained all function in the median nerve distribution, she was discharged from the hand service.

## DISCUSSION

Few studies have described cutaneous lesions (eg, erythema, ulcers, blisters, and painless ulcers) in the median nerve, with most involving carpal tunnel syndrome (CTS).[4-6] In 2011, Foti et al[5] described releasing compression of the median nerve for treating cutaneous lesions caused by CTS, with resolution of the lesions with no recurrence. In another case, several weeks of topical treatment for skin lesions associated with CTS resulted in complete healing.[4] The findings of the current case reinforce the efficacy of nonsurgical treatment of cutaneous lesions. Furthermore, cutaneous lesions may develop after an injury proximal to the median nerve, opposed to distally in CTS.

The cause of cutaneous manifestations to the median nerve is still debatable. Some studies have attributed the lesions to hypoesthesia, which can result in repetitive strain of the nerve.[5,6] A leading theory describes compression of autonomic fibers and sympathetic vasospasm.[5,6] In our case, the first explanation is unlikely because sensation was intact in the median nerve distribution. However, closed reduction for treating the fracture may have resulted in injury to the median nerve, possibly leading to sympathetic vasospasm and subsequent cutaneous manifestations.

Our patient was initially thought to have isolated AIN nerve injury, without evidence of median nerve sensory or motor palsy. With the cutaneous manifestations in the median nerve distribution (palmar digital cutaneous branch), it was postulated that her injury was to the posterior aspect of the median nerve, proximal to AIN branch. An injury to the posterior aspect of median nerve would cause both an AIN motor deficit and median nerve sensory loss, without median motor loss.[7] Although our patient did not report sensory loss, it is possible that she was unable to verbalize subtle sensory loss in her fingertips owing to her young age.

In children, nerve palsy after supracondylar fractures are thought to be transient, with self-resolution in 2 to 3 months.[8] Further investigation and surgical exploration may be required if symptoms do not resolve within this time.[8] The blisters in our patient resolved simultaneously with the symptoms of AIN palsy. However, further studies are needed to assess the relationship between cutaneous lesions and injuries to the median nerve at proximal locations. We believe the results of the current case can help guide research on causes of these rare manifestations and appropriate treatment.

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