

## Tips and Tricks on Assessing a Pediatric Hand Injury

### Medical Student Pearl by Borum Yang

MD Candidate, Class of 2024

Dalhousie University

Reviewed by Dr. B Ramrattan

Copy Edited by Dr. J Vonkeman



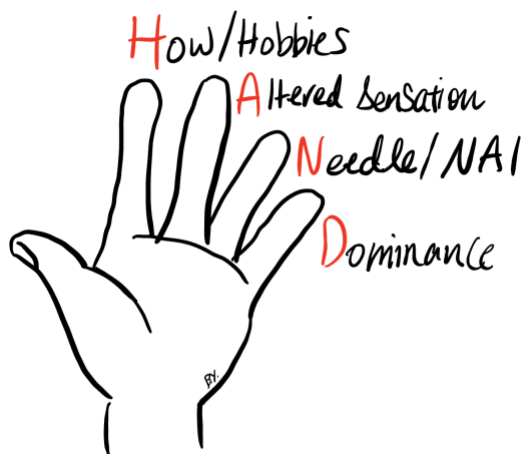
### Case Presentation:

You've just arrived for your shift in the emergency department, when your preceptor says, "How about you go see this 6-year-old in room 12?"

As a 3<sup>rd</sup> year clerk, you pick up the chart and read: "6yr old, hand injury."

### What Will Be Your Approach to History Taking?

A mnemonic a cool R1 taught you last week pops into your head: **HAND**<sup>1</sup>



## H: How

You recall that knowing the context and mechanism of injury will help guide your physical exam and generate a list of differential diagnosis<sup>2</sup>. Was it a FOOSH? Laceration with a potential tendon injury? High pressure injection injury increasing the risk of compartment syndrome?

## H: Hobbies

Sports and activities are important to note in pediatric hand injuries, as it will impact management. Kids can be less compliant with non use or being protective of their injured hand. We don't want lack of immobilization to be the cause of malunions and dehisced wounds<sup>3</sup>.

## A: Altered sensation

Ask about paresthesia or numbness as it can indicate a nerve injury.

## N: Needle/tetanus shot

Vaccinations up to date? Because if they were rolling in the dirt or got into a fight with the neighbour's dog, you may need to grab that tetanus shot.

## N: Non-accidental injury/ Child abuse

While most childhood fractures are caused by accidental trauma, it is important to always have this in the back of your head. Be on the lookout for red flags and inconsistencies in history including unwitnessed injury, or recurring fractures. Look for presence of other injuries and bruising and /or fractures at various stages of healing<sup>4</sup>.

## D: Dominant hand

From the history, it seems like the kid was playing basketball, and at one point the flying ball landed directly on the kid's outstretched fingers. They have been complaining of pain ever since.

## What Will Be Your Approach to Physical Examination?

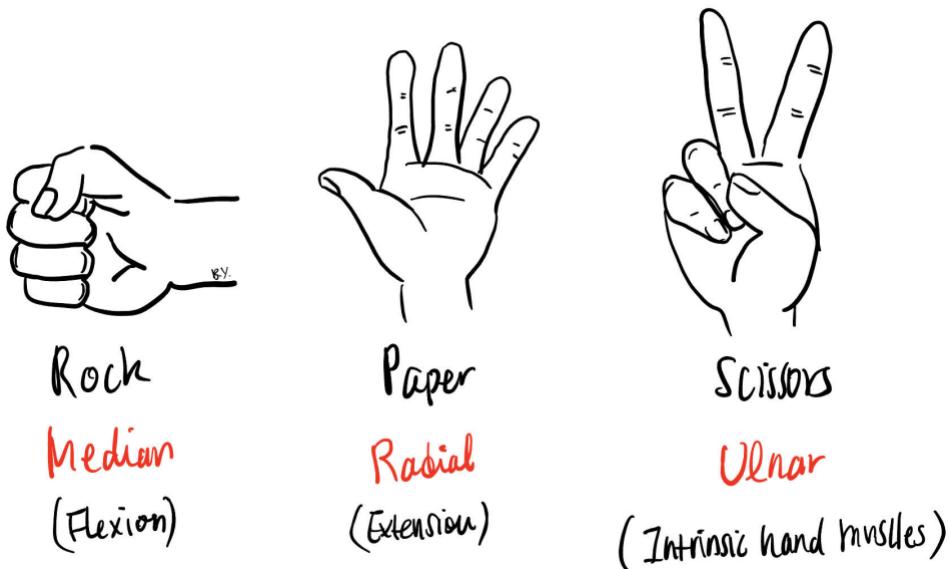
You quickly realize that the physical exam will be a challenge, as the kid is distracted and guarding their painful hand. Inspection alone can go along way with peds exams. You quickly go through the **SEADS** in your head:

**S**welling  
**E**rythema  
**A**trophy  
**D**eformity  
**S**kin Changes

On inspection, there is an obvious swelling and bruising of the right small finger. You quickly glance at the rest of the hand to check for other abnormalities or deformities. Nail beds and nail folds intact? Normal creases of the hands and fingers? Any areas of laceration or open wounds? Unusual skin changes, color changes, or atrophy of the thenar and hypothenar eminence? **Don't forget to compare findings with the non-injured hand.**

Next, you test sensation of the median, ulnar and radial distribution by asking if the kid can feel touch over their thumb, small finger and back of their hand.

Now determine active and passive range of motion. If the kid is not capable of following directions, asking the kid to play **ROCK PAPER SCISSORS**<sup>5</sup> is a good way to quickly glance at the motor function and integrity of tendons. Being able to straighten out all fingers without evidence of extensor lags. Making a full fist makes you less suspicious of a flexor tendon injury. Being able to cross fingers or manipulate them makes you less suspicious of an ulnar nerve injury.



Next, you want to check for any evidence of displaced or rotated fractures by observing the cascade of the fingers. A trick is to ask the kid to totally relax the hand, and you put the wrist in passive flexion. All fingers should passively extend. Then, you put his wrist in passive extension. All fingers should passively flex and for the most part point towards the base of the thumb. This is called the **tenodesis** exam and is helpful in looking for tendon injuries independent of nerve or muscle function.

Lastly, you keep chatting with the child while you gently palpate the wrist, carpal bones including the snuff box, PIP, DIP, MCP joints to rule out any other injuries.

There is normal capillary refill, and focal tenderness on palpation at the base of the proximal phalanx.

You report back to your preceptor and decide to order a hand x ray.



**Figure 1:** PA radiograph showing minimally displaced oblique Salter Harris type II fracture of the proximal phalanx of the right small finger<sup>6</sup>.

Upon discussion, the right hand is immobilized in an ulnar gutter to ensure proper immobilization. The time window for intervention maybe shorter in children than adults due to faster healing times. A call to a hand surgeon at the time of presentation is never a bad idea if you are unsure of the management. The kid is discharged with a follow up with the plastic surgeon as an outpatient within a week.

## Summary

1. Assessing hand injuries in pediatric patients can be challenging due to ability or willingness to cooperate. It can be helped with thorough observation, and use of familiar gestures and “games”
2. The complete hand exam includes assessment of the skin, vascularity, sensation, motor function and the underlying skeleton.
3. Management of pediatric hand fractures differ from adult fractures due to differences in anatomy, rate of healing and patient compliance.

## Helpful Videos from Boston Children’s Hospital on the Pediatric Hand Examination

<https://www.youtube.com/watch?v=1kHrs7NB6D0>

<https://www.youtube.com/watch?v=0Q3E-jTngAo>

<https://www.youtube.com/watch?v=jmMolYNkww0>

### References

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