

Diagnostic Test III  
Pediatric Long Bone Fractures

**Objectives:**

1. To enhance skills in assessing studies of diagnostic test performance for validity.
2. To learn to apply the results of a study of diagnostic test performance to clinical decision-making

**Assignment:**

1. Read the attached scenario.
2. Read the attached guidelines for reading articles concerning diagnostic tests.
3. Critically appraise the attached article using the accompanying worksheet.
4. Describe how you would deal with the consultant regarding the patient's management taking into account your review of the article.

**Clinical Scenario:**

You are working in a busy emergency department and 3 year-old male presents with arm injury. He fell while running through his family's kitchen last night. He briefly cried but then calmed down. He has not wanted to use his right arm since that time. His parents gave ibuprofen at night and let him go to sleep but he woke up this morning with with limited use of his right arm. He did not strike his head and he has had no vomiting or irritability. The parents have not noticed any other injuries or limitations. He has no complaints, but he wouldn't let his parents touch his right wrist.

His past medical history is not significant. There have been no prior ED visits. His immunizations are up to date. There is no concern for non-accidental trauma. His medications include ibuprofen as needed and he has no medication allergies.

On examination, he is alert, well-developed and well-nourished. His vital signs are unremarkable except for mild tachycardia. His head is without trauma, spine is non-tender, there are no bruises and he has full strength and range of motion of all extremities, except for his right arm. He has no tenderness of the shoulder or elbow, but seems tender upon palpation of his distal forearm. Perhaps it is slightly more swollen than the opposite side. He can wiggle all fingers, has good pulses and capillary refill. The forearm compartments are soft.

You are concerned for a forearm or wrist fracture and order an X-ray of the forearm. Unfortunately, there is an hour wait for the Xray and the patient has already been in the ED for an hour. The family is requesting to leave. You've performed bedside ultrasound on known fractures before—it seemed fairly straight forward. You suggest they remain for an ultrasound. You ultrasound the area of maximal swelling and discomfort and do not note any cortical defect or signs of fracture. The X-ray technician comes to the room and takes the patient back for an X-ray. It is negative for acute fracture. You refer the patient to his primary care physician for re-evaluation in a week.

Leaving your shift, you reflect on this case and wonder if a point-of-care ultrasound would be adequate to identify clinically important injuries in this patient.

**PICO:**

P: Emergency department, children, with suspected acute long bone fracture

I: Clinician-performed point-of-care ultrasound

C: Usual care

O: Diagnostic accuracy, morbidity, mortality of delayed/missed diagnosis, falsepositive rates and related sequelae.

**Search Strategy:**

Pubmed is searched using the the terms “Point of care ultrasound” AND “Fracture”, limited to studies of children. 71 results return and reviewing the abstracts, you select a recent paper that may answer your question.

**Citations:**

1. Guyatt G, Rennie D, Meade MO, Cook DJ Editors, The Users' Guides to the Medical Literature, A Manual for Evidence-Based Clinical Practice. 3rd Edition. McGraw-Hill 2015, Chapter 18. (pp 345-357)
2. Weinberg ER, Tunik MG, et al. Accuracy of clinician-performed point-of-care ultrasound for the diagnosis of fractures in children and young adults. Injury. 2010 Aug;41(8):862-8.
3. Worksheet for the evaluation of an article on diagnosis test performance.