

## Management of Distal Radial Fractures

### in Young Patients by Non-Orthopedists in an Urgent Care Center

**Urgent message:** Distal radial fractures in children can often be treated by non-orthopedists without the need for full casting in an urgent care center that can perform simple splinting, thus sparing hospital referral.

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#### Introduction

Wrist fracture is a common injury in children.<sup>1</sup> Many of these fractures are buckle or torus fractures. Traditionally, treatment for buckle fractures has been short-arm casting for two to four weeks.<sup>2</sup>

However, questions have been raised as to the need for such treatment. A number of recent studies have indicated that many such fractures may be managed without casting by the use of either elastic bandaging alone<sup>3</sup> or splints.<sup>4-6</sup> Plaster splints can easily be applied in an urgent care framework, thus sparing the family the need for hospital referral.

For appropriate care to be delivered in an urgent care setting, it is important not only that the treatment is correct, but that the diagnosis is, as well. Clinical evaluation



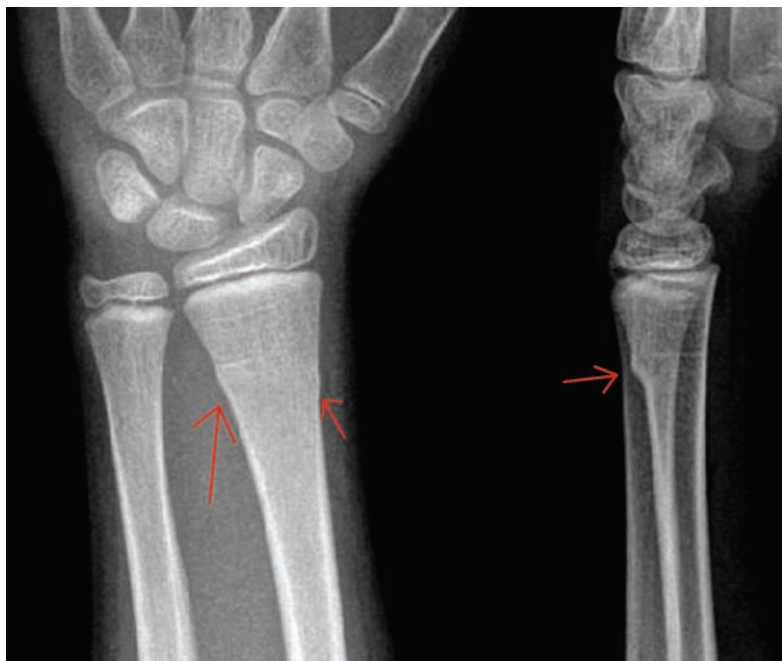
alone of the injured wrist is likely to miss 20% of fractures and overall 37%, which indicates that x-ray evaluation is clinically important in wrist fracture care.<sup>7</sup>

The utility of an x-ray evaluation, however, assumes that the initial x-ray assessment to identify the presence and severity of the fracture is accurate even without on-site review by a radiologist or orthopedist. In light of the above, we decided to study our experience in TEREM Emergency Medical Centers in relation to the accuracy of interpretation of wrist x-ray findings in children.

#### Materials and Methods

##### Setting

TEREM Emergency Medical Centers is a privately owned medical services company based in Jerusalem, Israel



that establishes and manages freestanding emergent care clinics. The central clinic is open 24 hours per day, 365 days per year. An orthopedist is on site in this particular clinic for approximately six hours daily. Four other TEREM clinics are open evening and weekend hours but do not have an on-site orthopedist at any time. All five clinics provide digitalized on-site radiology during all operating hours.

Films are read initially by the treating physician. All films undergo review by a radiologist within 24 hours and any “mismatches” between the initial reading and “official” reading are followed up by a senior physician to assure that there is no need for change in care.

#### Data Source

TEREM uses a proprietary electronic medical record (EMR) system called PARPAR to register, clinically manage, and administer all visits, laboratory tests, and radiological studies. Data captured into PARPAR include the patient’s demographic information, the patient’s complaint on arrival, the diagnosis, the main procedures done, and the referral decision made. The digital radiological images are stored short term in an online picture archiving and communication system (PACS) and long term in a compressed jpeg format in an online, web-accessible archive. Printed materials, such as the handwritten doctor’s chart, are scanned into the system and attached to the matched patient EMR.

A unified “data warehouse” exists for housing the combined data from all TEREM urgent care clinics. A set of web-based forms was developed to allow for the review of individual charts as well as the extraction of summary statistics. For example, a reviewer can request a list of visits by patients of a certain age with a specified diagnosis.

The list of retrieved results representing visits throughout all the TEREM clinics includes web-based links to the matching charts and x-ray reports done during the given visits. Basic statistics can be generated based on combinations of query criteria. In this manner we can easily extract the number of children up to age 15 who had forearm x-rays.

#### Study Subjects

All children up to age 15 who presented from January 2, 2006 to September 30, 2006 to any TEREM clinic for whom a forearm x-ray was performed.

#### Data Analysis

Categorical data were compared by chi square analysis. Statistical significance was set at  $p < .05$ .

#### Results

During the study period, 883 children had a radiological study of the forearm due to suspected trauma. Of these, 611 (69%) were managed by a non-orthopedist without the real-time involvement of a radiologist or orthopedist. The non-orthopedist diagnosed a distal radial fracture in 253 (41%) of these visits. In 11 (4.3%) of these 253 visits, the radiologist subsequently read the film as normal (i.e., overcall by the non-orthopedist). In 38 (10.6%) of the 358 visits where the non-orthopedist read the film as normal, the radiologist identified a distal radial fracture (i.e., undercall by the non-orthopedist).

The remaining 272 (31%) of the 883 visits were managed by an orthopedist. The orthopedist diagnosed a distal radial fracture in 239 (88%) of the 272 visits. In eight (3.3%) of these 239 visits, the radiologist read the film as normal (i.e., overcall by the orthopedist). In two (6.1%) of the 33 visits where the orthopedist read the film as normal, the radiologist identified a distal radial fracture (i.e. undercall by the orthopedist).

Neither the differences in undercall nor overcall rates between orthopedist and non-orthopedist were statistically significant.

**Limitations**

As this was a chart-based retrospective study, we do not have the final outcome data for these patients. Such a follow-up study is being planned. However, as the focus of the study is the ability to recognize the fracture and track the disposition of these patients, we do not feel this deters from the conclusion of this study.

**Treatment Discussion**

The traditional treatment for buckle wrist fractures has been short-arm casting for two to four weeks. However, Walker, et al conducted a survey of 104 pediatric orthopedists and showed wide variety of clinical practice.<sup>6</sup>

The traditional treatment is not without problems.

First of all, typically it requires at least two evaluations by an orthopedist, one at the time of the injury and the second at the time of cast removal. For example, Plint et al<sup>2</sup> reviewed the experience of treating 309 patients with buckle fractures in the pediatric emergency department of a pediatric hospital. Follow-up data were available for 276 (89%) subjects, all of whom had been referred to the orthopedic service of the same hospital. In fact, two-thirds of these subjects had more than one follow-up visit with an orthopedist and nearly half of these subjects had more than one radiograph obtained.

As none of the children needed further orthopedic interventions, the authors questioned the need for these visits.

Furthermore, the traditional treatment is not without a price:

- Each visit to an orthopedist has a cost to the parents in terms of both time and money.
- Each x-ray is added radiation exposure for the patient.

Casting itself has a risk of complications. In Plint's study quoted above, 32 subjects (12%) had an unplanned ED visit because of cast- or injury-related problems. Of these, 30 (94%) were for wet, damaged, or tight casts; two (6%) were for broken splints. In an additional study, Plint et al demonstrated the improvement in quality of life when children are NOT casted.<sup>4</sup>

Van Bosee, et al described use of plaster splints created with the use of simple material such as plaster of paris-impregnated gauze, stockingnette, cast padding, and elastic bandages.<sup>5</sup> The protocol he,

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an orthopedist, recommends is:

- diagnosis using radiographs and application of a removable plaster-of-paris volar forearm splint in the emergency department
- one orthopedic office/clinic visit to confirm diagnosis of torus fracture and to provide splinting protocol instructions.

Ultimately, the splint would be discontinued at the discretion of the family. The removable splint would cause less disruption of daily activities. The need for an additional orthopedic visit for repeat radiographs and cast removal would be eliminated, reducing the patient's time lost from school, the parent's time lost from work, and the physician's time and costs.

This type of treatment can easily be performed in an urgent care setting by non-orthopedists. A similar splint is, in fact, done routinely in our clinics. The findings of the current study (that the percentage of overcall and undercall between orthopedists and non-orthopedists is not significantly different) support the contention that such care can be offered in this setting.

When this is coupled with review of all x-rays by a radiologist within 24 hours and call back by a senior physician in the case of any mismatches, a safety net is in place and patients are not placed at risk.

### **Conclusions**

Non-orthopedists can reliably identify and manage trauma cases that are suspicious for fractures of the distal radius. With minimal training, they can appropriately apply splints that can be made of inexpensive, readily available materials. In combination with radiologist review within 24 hours, as well as a call-back follow-up system by a senior physician, initial undercalls will still be managed appropriately. Significant monies can therefore be saved, as management of these cases in an urgent care center is less expensive than direct ED care. ■

### **References**

1. Khosla S, Melton LJ 3rd, Dekutoski MB, et al. Incidence of childhood distal forearm fractures over 30 years: A population-based study. *JAMA*. 2003;290:1479-1485.
2. Plint AC, Perry JJ, Tsang JLY. Pediatric wrist buckle fractures. *Can J Emerg Med*. 2004;6:397-401.
3. West S, Andrews J, Bebbington A, et al. Buckle fractures of the distal radius are safely treated in a soft bandage: a randomized prospective trial of bandage versus plaster cast. *J Pediatr Orthop*. 2005;3:322-325.
4. Plint AC, Perry JJ, Correll R, et al. A randomized, controlled trial of removable splinting versus casting for wrist buckle fractures in children. *Pediatrics*. 2006; 117(3):691-697.
5. van Bosse HJ, Patel RJ, Thacker M, et al. Minimalistic approach to treating wrist torus fractures. *J Pediatr Orthop*. 2005;4:495-500.
6. Walker JK, Kane KY. Is splinting of distal radius torus fractures an acceptable alternative to casting? *J Fam Pract*. 2002;4:382.
7. Pershad J, Monroe K, King W, et al. Can clinical parameters predict fractures in acute pediatric wrist injuries? *Acad Emerg Med*. 2000;10:1152-1155.