

Buckle fractures of the wrist - diagnose and discharge.

Clinical Topic Review

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I declare that this is my own work with no plagiarism.

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Introduction

Fractures of the distal radius affect approximately 16 per 1000 children per year in the UK.¹ They can be divided into buckle, greenstick, metaphyseal, physeal injuries, and those with associated elbow pathology, buckle (*torus* (L)) being the most common type.²

Buckle fractures are unique as there is a failure of the cortex on the compression side only³, the tension side of the bone remaining intact. Hence, deformity does not occur. Traditional management is immobilisation in a below elbow POP for three to four weeks with fracture clinic follow up.¹ However, after working in several Emergency Departments (EDs), I have seen variation both in the type of immobilisation used and follow up. This may reflect the lack of an evidence based standard, but also perhaps a misunderstanding of the inherently stable nature of buckle fractures. It exposes our patients to inequality of care.

Current practice

A retrospective case note review of patients diagnosed with buckle fractures of the wrist over a four month period at Stepping Hill Hospital was performed to investigate current practice. (Appendix 1) Despite varied management, no patient required operative intervention, had unsatisfactory healing or lack of functional recovery. Over this period, discharge from the ED would have saved 58 fracture clinic appointments and any associated material costs.

Aims

The aim of this CTR is to appraise the current evidence for

- the need for follow up or repeat XR of buckle fracture of the paediatric wrist, and
- the optimum form of immobilisation.

Based on these findings, a new management protocol will be designed and implemented at Stepping Hill Hospital.

Method

Two 3 part questions were designed:

- 1) [In a child with a buckle fracture of the distal radius] is [review in fracture clinic +/- repeat XR] necessary [to ensure fracture healing in a satisfactory position and functional recovery]?
- 2) [In a child with a buckle fracture of the distal radius] [which form of immobilisation] provides [optimum symptomatic relief whilst reducing time to functional recovery]?

For question 1 the following search string was designed:

exp radius fracture\$/ OR wrist fracture\$.mp. OR radius fracture\$.mp. OR radial fracture\$.mp. OR (torus adj5 fracture\$).mp. OR (buckle adj5 fracture\$).mp. OR (forearm adj 5 fracture\$).mp. OR exp fracture\$, closed/ OR exp *Wrist/pa, ab, su, ra OR exp

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*Forearm/ab, su, ra, pa

AND

exp child\$/ OR child\$.mp. OR paediatric\$.mp. OR exp pediatrics/ OR pediatric\$.mp. OR
exp child, preschool/ OR exp infant/ OR exp adolescent/ OR infant\$.mp. OR
adolescent\$.mp. OR toddler\$.mp.

AND

complications.mp. OR prognosis.mp. OR exp prognosis/ OR outcome.mp. OR
recovery.mp. OR exp treatment outcome\$/ OR exp recovery of function/

For question 2, the search string was as above, except that the final clause was replaced
with:

exp splint\$ OR exp brace\$ OR exp cast\$, surgical OR exp immobilization OR
immobilisation.mp OR immobilization.mp OR futura.mp OR splint\$.mp OR brace.mp
OR plaster.mp OR cast\$.mp

A literature search was conducted using:

- 1) Medline 1950 - July Week 4 2010 via OVID interface
- 2) CINAHL, 1981 to present, via NHS Evidence Health Information Resources
- 3) EMBASE, 1980 to present, (as above)
- 4) British Nursing Index, 1985 to present, (as above)
- 5) Cochrane Database - “buckle”, “radius”, “fractures”
- 6) Google scholar - “buckle”, “radius”, “fractures”
- 7) References of selected papers were searched for any other relevant articles.

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Unpublished or incomplete trials were identified from the International Clinical Trials Registry Platform (<http://www.who.int/ictrp/en/>), the meta register of clinical trials (<http://www.controlled-trials.com/mrct/>), and <http://www.clinicaltrials.gov/>.

Search Outcome

Fifteen completed articles pertinent to question 1 were identified, however, 6 papers^{1,4-8} were excluded. One⁴ as it was a study proposal, the other five (including the NICE guideline¹) as they were literature reviews each using only a proportion of the articles already identified.

Hence, nine articles were included for appraisal.^{2,9-16}

The second search identified two extra articles of note.^{17,18}

Two unpublished RCTs were identified and the authors contacted. Hudson¹⁹ randomised patients to POP or double tubi-grip but basic methodological problems prohibited write up and publication. Williams²⁰ randomised patients to POP or volar splint and presented findings at the Paediatric Academic Societies Meeting in Baltimore in 2009. It is currently being written up. The authors advocate giving patients/parents the choice of either POP or splint.