

Manipulation of Fractures in the Children's ED Derby only

Reference no.: CH CLIN C57/April 22/v002

1. Introduction

This guideline describes the types of fracture, types of analgesia and standard operating procedure for the manipulation of closed fractures in the Children's Emergency Department.

2. Aim and Purpose

This guideline describes the types of fracture, types of analgesia and standard operating procedure for the manipulation of closed fractures in the Children's Emergency Department (CED). This guideline was implemented during the Covid-19 pandemic and has been found to be working well since implementation.

A previous retrospective audit was performed looking at a 1-year period of wrist and forearm fractures up to March 2018. Over this period 98 fractures required intervention and 34% had a manipulation in CED. 38% however were admitted for a manipulation in theatre, of which 65% could have been attempted within the emergency department.

These guidelines have been informed by guidelines used in other regional centres and the pathway has been working well since implementation. Between June and Oct 2020 an audit was done which showed that there had been a 51% increase in the manipulations performed in CED and a 47.7% decrease in the number of children ultimately requiring surgery in theatre. A patient satisfaction survey also showed that 100% of parents feedback that the manipulation relieved their child's pain ('definitely' in 81% and the remainder 'to some extent'). All parental experience indicators and comments were positive.

3. Definitions, Keywords

Manipulation
Fracture
Entonox
Diamorphine
Fentanyl
Paediatric

4. Manipulation of Fractures in the Children's ED

The purpose of this guideline is to identify suitable closed fractures for manipulation under analgesia and Entonox in the Children's Emergency Department (CED). Analgesia may be provided by a variety of drugs that includes simple analgesics such as paracetamol and ibuprofen and opiates given by the oral, intravenous and intranasal routes. Entonox (50% nitrous oxide) can be used for light sedation and analgesic properties.

For younger children, those unable to effectively use Entonox or where staff believe that the child/young person are unlikely to tolerate the procedure with intranasal Diamorphine/fentanyl and Entonox, the use of **intravenous sedation** can be considered. Use this guideline in conjunction with the Sedation for Procedures in CED guideline (CH CLIN C24) and consultation with senior CED medical/nursing staff to agree on an appropriate management

for individual children. Intravenous sedation should only be given by a senior clinician with adequate training and experience to do so.

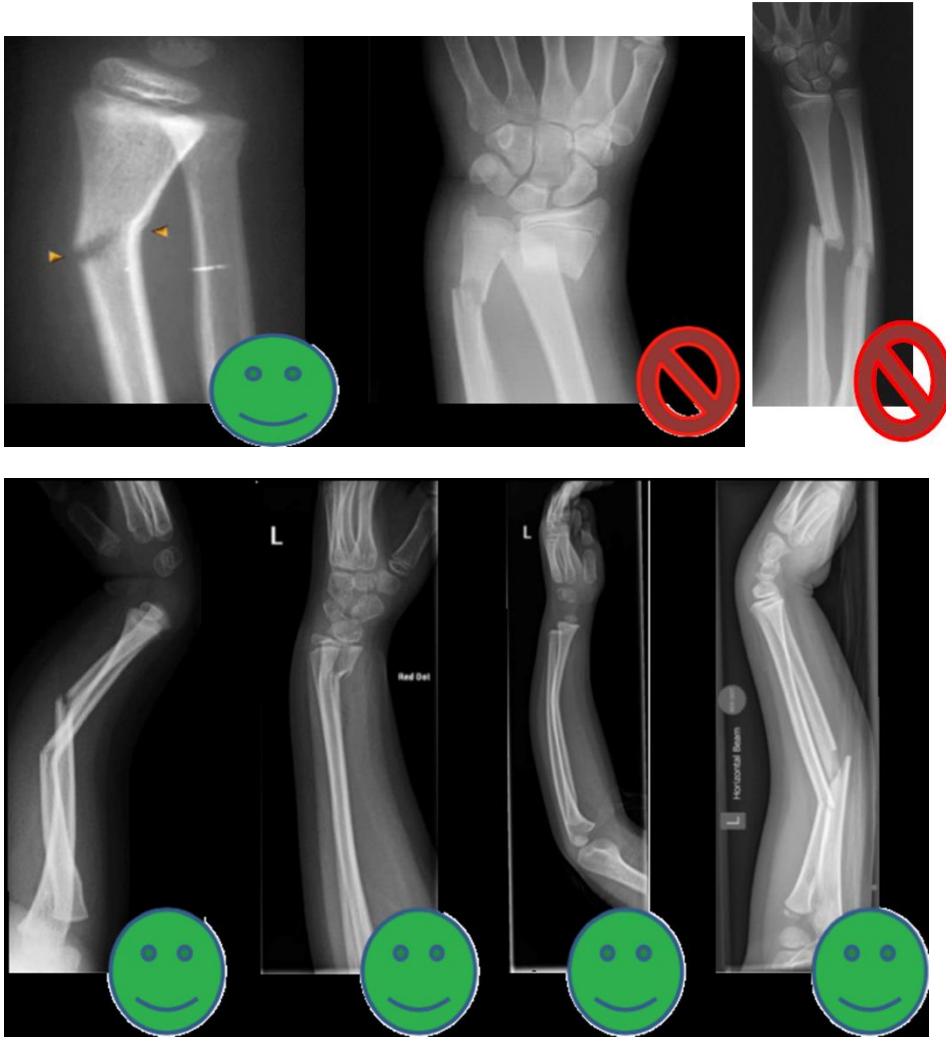
Children considered appropriate for manipulation in the CED;

- 5 years or over and able to effectively use Entonox
- Forearm and wrist fractures meeting the following characteristics;
 - Closed greenstick fractures
 - Salter-Harris 1 and 2 wrist fractures that have not shortened
 - The Periosteal hinge should be intact on the concave side of the fracture (i.e. will thumb back)
 - Any degree of angulation can be considered
 - Any location of forearm or wrist fracture can be considered. More proximal forearm fractures are less likely to be successful, but may still be attempted.
 - The fracture is easily reducible with a simple reduction manoeuvre preferably at first attempt
- Other fractures requiring MUA urgently are those at risk of compartment syndrome given fracture pattern or where the skin may be at risk if not manipulated. Case by case discussion should occur as to whether procedure sedation or MUA in theatre will be required. Examples are
 - Ankle fractures where the skin may be at risk

Fractures **NOT** to be manipulated in the Children's Emergency Department under Entonox and intranasal Diamorphine/fentanyl,

- The fracture is in an acceptable alignment or will remodel without intervention
- The manipulation will require significant traction and complex reduction manoeuvres
- There is complex injury which will require operative stabilisation regardless of manipulation
- Open fractures that require operative debridement
- Children < 5 yrs old but otherwise appropriate for manipulation in CED should be discussed on a case by case basis as to their ability of coordinate Entonox or whether other procedural sedation can be used. This will be on the agreement of senior CED nursing and medical staff, the orthopaedic team and parental consent.

The final decision about whether to proceed with a manipulation within the Emergency Department rests with the CED consultant. Appropriate wrist and forearm fractures for CED manipulation are indicated by green smiley faces below;



Out of hours when a Paediatric Emergency Consultant or Paediatric ENP is not available, only proceed with a manipulation in ED if members of staff with the appropriate skills/experience are available. Consider liaising with the adult ED registrar if required, however the adult ED department will not always be able to support and the child may then require admission for a manipulation next day.

Joint dislocations

Shoulder and elbow dislocations without fractures need to be reduced as soon as possible in CED. Shoulder dislocations are less common in children than in adults. In most cases Entonox, analgesia and relaxation techniques will be sufficient to allow reduction. The use of additional IV sedation may be required in some cases and if used this should only be done by those with the relevant skills and experience (Use Sedation for Procedures in CED CH CLIN C24 guideline). For elbow dislocations, once radial head or radial neck fractures have been carefully ruled out, these can normally be reduced by using Entonox and analgesia alone.

Procedure/Pathway

Within 1st hour in CED

- Appropriate analgesia and LMX applied on arrival
- X-ray performed ASAP and fracture confirmed by orthopaedic team to require manipulation
- Referral to the Orthopaedic team within 1 hour of presentation to the emergency department to facilitate a timely manipulation



- T&O to confirm **meets criteria** for manipulation within CED
- Liaison between Orthopaedic team and senior nursing/ CED consultant staff to confirm
 - a. Patient likely to tolerate procedure with Diamorphine/fentanyl and Entonox
 - b. If not, consider whether intravenous procedural sedation can be used (CH CLIN C24).
 - c. Staffing and current state of the department can support procedure



- Orthopaedic team to obtain **written consent** from the parents
- Procedure must take place in CED in a room appropriate to level of sedation used.
- Agree a time to aim for the manipulation to begin



- Once the orthopaedic registrar is ready to perform the manipulation – Give intranasal (IN) diamorphine/fentanyl if not already given/received*. If analgesia inadequate consider a second oral or IV dose of morphine in time for procedure,
- Attach continuous monitoring. Record pain score pre & post procedure & hourly in CED.
- A Paediatric ED nurse must be present to administer Entonox and ensure the child is tolerating the procedure. Procedure not to commence until nursing staff are happy with analgesia level
- 10 minutes preparation to familiarise with Entonox and achieve adequate level of analgesia
- After reduction, a full Plaster-of-Paris (not backslab) must be applied by orthopaedic team (stockinette, single layer wool snug with 50% overlap, snug POP with 3-point moulding)



If at any time the child becomes unacceptably distressed or the parents are unhappy to proceed there should be no further attempts at ED manipulation under current level of sedation



Procedure/Post procedure

- Post manipulation x-ray reviewed by orthopaedic team
- Observation until medically fit for discharge depending on level of sedation used for procedure
- T&O team to record procedure in clinical record
- CED team to record details of analgesia/sedation and how well the procedure was tolerated.
- Ask Child/family to fill in audit/survey tool for the procedure

Follow-up

- Orthopaedic team to review the case next morning with consultant
- Fracture clinic follow-up to be arranged within 1 week for check x-ray

*The duration of action of IN diamorphine is 3-4 hours and the terminal half-life is 8 hours so a second dose may not be required if adequate analgesia achieved. A shorter acting agent should be considered if a second dose is required e.g. PO/IV morphine or intranasal fentanyl if available.

5. References (including any links to NICE Guidance etc.)

Manipulation of fractures in the Paediatric ED Trust guideline, Nottingham University Hospitals NHS Trust, 2018

Brighton and Sussex University Hospitals NHS Trust – Pathway for upper limb fractures 70% nitrous manipulation. Dec 2016

Kurien et al, Manipulation and reduction of paediatric fractures of the distal radius and forearm using intranasal diamorphine and 50% oxygen and nitrous oxide in the emergency department. 01 Jan 2016. <https://doi.org/10.1302/0301-620X.98B1.36118>.

NICE guidelines NG38L Fractures (non complex) @ assessment and management. Feb 2016.

6. Documentation Controls

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