Worcestershire Acute Hospitals NHS Trust

Management of Paediatric Forearm and Wrist Fractures Requiring Manipulation

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

Wrist and forearm fractures are common fractures in children. The gold standard management for these fractures is casting, with or without reduction by manipulation, depending on the degree of angulation or displacement. Of those fractures that require reduction by manipulation, the majority can be reduced by manipulation under appropriate analgesia in the emergency department, avoiding the need for admission and a general anaesthesia.

This guideline is for use by the following staff groups:

All qualified healthcare professionals who are involved in the care and management of paediatric patients with wrist and forearm fractures within both Emergency Departments across the Trust.

Lead Clinician(s)

Dr Catrin Dyer	Consultant in Emergency Medicine
Approved by Urgent Care Divisional Governance Meeting on:	19th April 2023
Approved by Medicines Safety Committee on:	Not needed, medicines included approved in other trust guidelines
Review Date: This is the most current document and should be used until a revised version is in place	19th April 2026

Key amendments to this guideline

Date	Amendment	Approved by:
April 2023	New document approved	Urgent Care Divisional Governance Meeting

Management of Paediatric Forearm and Wrist Fractures Requiring Manipulation.

Introduction

Wrist and forearm fractures are common fractures in children. The gold standard management for these fractures is casting, with or without reduction by manipulation, depending on the degree of angulation or displacement. The manipulation used to be done in theatre but a British Orthopaedic Association standard published in May 2021 (Appendix 1) and endorsed by the Royal College of Emergency Medicine recommends that the manipulation and casting can be done safely in the emergency department when done under appropriate analgesia. The purpose of this guideline is to provide a clear pathway for the process of managing paediatric patients with wrist and forearm fractures, in particular those who require manipulation of their fracture, to ensure timely management of these injuries.

Patient Group

Any paediatric patient (<16 years old) presenting with a wrist or forearm injury to the emergency department who have an obvious clinical deformity of the forearm on examination.

Inclusion

- Patients with an **obvious clinical deformity of the forearm** on examination who have a simple wrist or forearm fracture which is **angulated or partly displaced** enough to warrant a manipulation

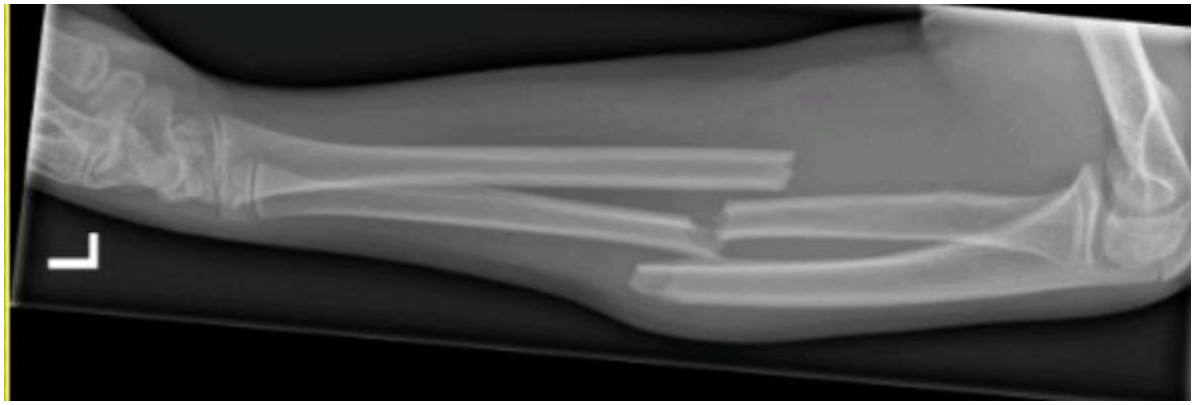
- Fractures which are likely to be easily **reducible with simple reduction manoeuvre on 1st attempt**

For example:-

Exclusions

- Fractures that are **off-ended**
- Fractures that **following discussion require management in the operating theatre** due to either patient or injury related fracture, e.g. open fractures, complex injury requiring operative stabilisation, need for image intensifier, no image intensifier will be available in the ED. In these cases, a plaster should be applied to aid pain management and no manipulation of any degree should be carried out.

For example:-



Process

Triage

- Mechanism of injury, Think Safeguarding
- Observations and commence limb observations
- Pain score, weight and analgesia based on pain score (likely IntraNasal opiate)
- X-Ray request of forearm, PA and Lateral.
- Escalate need to see patient as soon as X-Rays completed

Clinical Assessment

- History - Mechanism of injury, Think Safeguarding
- Examination – in particular neurovascular status of limb
- Re-assess pain score, further analgesia if needed
- Review X-Ray
- Inform ED consultant (0800-2200) or ED registrar (2200-0800) if angulated / displaced wrist / forearm fracture
- Refer to orthopaedic registrar to review within 30 minutes for discussion regarding manipulation in the ED
- If ED consultant or registrar available and competent to do so, ED can complete procedure

Review by Orthopaedics Registrar

- History and Examination
- Decision made that the fracture requires manipulation and casting and it is suitable to be done under appropriate analgesia in the ED
- Discuss with the ED consultant (0800-2200) or ED registrar (2200-0800) to confirm suitability to perform procedure in the ED

Procedure – documentation of procedure to be done on PF additional document for Manipulation of Forearm and Wrist Fracture (Appendix 2)

- To be completed once and once only.
- To be completed by a competent orthopaedic registrar (most likely scenario) or EM consultant, trained EM registrar or orthopaedic consultant
- Clinician undertaking procedure to take consent from child and parent / carer and document clearly in the notes
- Procedure to take place in a CED cubicle, not in the adult plaster room
- A CED nurse must be present, to administer the analgesia and ensure the child is tolerating the procedure, along with another practitioner who is competent to apply the plaster
- The child should ideally be 5 years or over – however, if staff feel that a younger child can co-ordinate the use of Entonox then this is acceptable.
- Once the clinician is ready to do the procedure the child must be given the intranasal opiate
    - Intranasal diamorphine, if not received a dose in the last 2 hours or
    - Intranasal fentanyl, if not received in the last 1 hour
- The child also needs 10 minutes preparation time with the nurse, familiarising themselves with Entonox and developing an appropriate analgesia level. The procedure cannot be started until the nurse is happy with the level of analgesia.
- If at any time the child becomes unacceptably distressed or the parent / carer are not happy to continue with the procedure, then there should be no further attempts at manipulation in the ED.
- After reduction, plaster to be applied, below elbow backslab for wrist fractures, above elbow backslab for midshaft fractures, and monitor for 20 minutes (as per Intranasal diamorphine / Intranasal fentanyl guideline) before check X-Rays completed
- Re-assess neurovascular status of the limb and check finger movements
- If reduction satisfactory, child can be discharged 1 hour after Intranasal opiate administration.
- Book into virtual fracture clinic appointment within 48 hours, orthopaedic consultant will arrange further subsequent follow up as appropriate.
- Discharge home when ready with advice to take oral analgesia (paracetamol and ibuprofen) and patient advice leaflet (Appendix 3), can also be found on PatientFirst.
- If reduction is not satisfactory, child must be admitted for further manipulation under anaesthesia

Children presenting to the Alexandra Hospital

The above process can take place at the Alexandra Emergency Department if and when there is a competent orthopaedic registrar or consultant or emergency medicine consultant or registrar onsite. When this is not the case, the child should undergo triage and clinical assessment as described above, have a plaster applied for pain management and be referred over to the orthopaedic team at WRH for assessment and manipulation in the ED. The transfer should occur as soon as possible via an emergency ambulance if intranasal opiate has been administered or by parents (if possible) and Intranasal opiate not administered.

Following discharge

If a child returns to the emergency department due to problem with the injury, the child should be seen directly by the orthopaedic team either in their trauma clinic if in hours or in the ED if out of hours.

Other guidelines to be used in conjunction with this one:-

WAHT-A&E-028 - Guideline for the use of Intranasal Diamorphine

WAHT-A&E-038 - Intranasal Fentanyl for the Management of acute pain in children within the Emergency Department

WAHT-TP- 054 - Administration of Entonox®

Monitoring

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the Policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	These are the 'key' parts of the process that we are relying on to manage risk. We may not be able to monitor every part of the process, but we MUST monitor the key elements, otherwise we won't know whether we are keeping patients, visitors and/or staff safe.	What are we going to do to make sure the key parts of the process we have identified are being followed? (Some techniques to consider are; audits, spot-checks, analysis of incident trends, monitoring of attendance at training.)	Be realistic. Set achievable frequencies. Use terms such as '10 times a year' instead of 'monthly'.	Who is responsible for the check? Is it listed in the 'duties' section of the Policy? Is it in the job description?	Who will receive the monitoring results? Where this is a committee the committee's specific responsibility for monitoring the process must be described within its terms of reference.	Use terms such as '10 times a year' instead of 'monthly'.

References

Early Management of the Paediatric Forearm Fracture. British Orthopaedic Association Standard Published May 2021. BOAST - Early Management of the Paediatric Forearm Fracture

Guideline for the use of Intranasal Diamorphine. WAHT-A&E-028, approved May 2021

Intranasal Fentanyl for the Management of acute pain in children within the Emergency Department. WAHT-A&E-038, approved June 2021

Appendix 1 – British Orthopaedic Association Standard

British Orthopaedic Association

BOA STANDARD

BSCOS

The Royal College of Emergency Medicine

Early Management of the Paediatric Forearm Fracture

May 2021

Background and justification

The most common site of fractures in children is the forearm. Casting is the gold standard of care for most fractures as children have a capacity to remodel following fracture union, permitting the bones to heal with a greater degree of angulation or displacement than could be accepted in an adult without long-term consequences. The wrist is more tolerant of angulation and displacement than the forearm shaft. For the majority of forearm fractures that exceed remodelling potential, early closed reduction by manipulation, avoiding the need for admission and general anaesthesia is the treatment of choice.

Inclusions:

Skeletally immature patients seen in Emergency Departments following an angulated (but not off-ended) forearm fracture.

Exclusions:

Fractures that following interdisciplinary discussion require management in the operating theatre due to either patient or injury related factors.

Standards for Practice

1. All units managing children's forearm fractures should have protocols to enable early, definitive manipulation and casting without necessitating admission. This protocol should specifically address processes around procedural analgesia and sedation as well as the timely response to manipulation.
2. A documented assessment of the limb, performed on presentation, should include the status of the radial pulse, digital capillary refill time and the individual function of the radial, median and ulnar nerves.
3. At the time of initial assessment, effective analgesia should be administered. Pain scores should be recorded frequently, to ensure that pain relief is maintained throughout.
4. Orthogonal X-rays should be available to allow proper diagnosis and planning.
5. The child, if competent, carers and clinicians must agree with the intervention. Formal consent should be documented according to local protocols.
6. Manipulation of children's fractures should occur in a location suitable to ensure safe practice with monitoring and appropriate facilities to afford effective treatment and casting, managing complications of and recovery from medication.
7. Manipulation of a child's forearm fracture should be performed by competent orthopaedic practitioners, as defined by local protocols.
8. Manipulation of a child's forearm fracture should be followed by orthogonal X-rays.
9. Before discharge a recorded assessment of the neurovascular status of the limb should be repeated as described in standard two.
10. Oral analgesia to take home and dedicated information leaflets, that include red flag symptoms and contact details, should be provided. Prior to discharge, a fracture clinic appointment should be made to occur within 7 days of injury.
11. A documented review of the case and images by a consultant orthopaedic surgeon should occur within 48 hours of injury.
12. Regular multi-disciplinary audit against the above standards should be undertaken, which should include monitoring of the rate of admission for further procedures on the limb.

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Appendix 2 – Patient First Paediatric Forearm and Wrist Manipulation proforma

Emergency Department
Paediatric Wrist / Forearm Fracture Manipulation

AGH	
WRH	

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<Name>	<Age>	<DoB>	<Hosp number>	<NHS Number>	<ED episode number>

Doctor:	CED Nurse:	Plaster assistant:

INDICATION: Wrist fracture □ Forearm fracture □

PRE-PROCEDURE CHECKLIST:

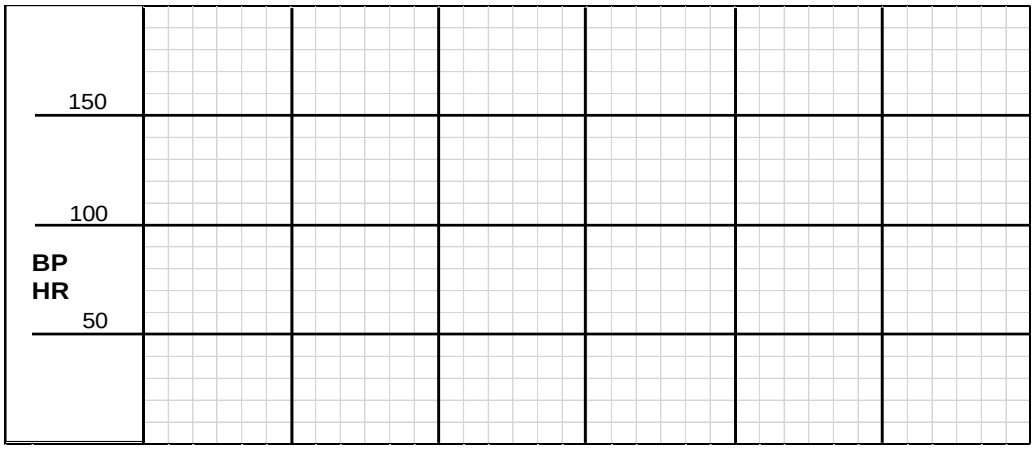
	YES	NO
XR completed and seen		
Suitability for manipulation in ED with analgesia confirmed		
Side of injury confirmed by clinician and nurse		
Consent completed and documented in notes		

PRE-PROCEDURE PAIN SCORE: Mild (0-3) □ Moderate (4-6) □ Severe (7-10) □

ANALGESIA PRESCRIBED ON ED CHART: Intranasal Diamorphine □ Intranasal Fentanyl □
ADMINISTERED AT: _____
ENTONOX PROVIDED THROUGHOUT PROCEDURE: Yes □ No □

PROCEDURE OBSERVATIONS:
Minimum of Pre-procedure, immediately after procedure, 10 min and 20 minutes post procedure.

	Time					
A, V, P, U						
Respiratory Rate (bpm)						
O2 Saturations (%)						
O2 flow (L) – if needed						



ANY ADVERSE EVENTS:
Allergic reaction to drugs □
Nausea or vomiting □
Drowsiness □
Respiratory depression □
Failure to tolerate procedure □
Failure of satisfactory reduction □
Other □ Please provide further details:

ANY INTERVENTIONS REQUIRED:
YES □ No □
If yes, please provide further details:

POST- PROCEDURE PAIN SCORE: Mild (0-3) □ Moderate (4-6) □ Severe (7-10) □

POST-PROCEDURE CHECKLIST:

	YES	NO
Neurovascular status re-checked		
Repeat XR done and satisfactory position achieved		

OUTCOME: Discharge □ Admit for MUA □

DISCHARGE CHECKLIST:

	YES	NO
1 hour post Intranasal opiate		
Observations stable		
Pain controlled		
Virtual Fracture clinic booked		
Patient advice leaflet given		

Doctor:	CED Nurse:	Plaster assistant:
Date:	Time:	

Worcestershire Acute Hospitals NHS Trust

Appendix 3 – Patient Advice Leaflet

Paediatric Forearm and Wrist Fracture Manipulation

Worcestershire Acute Hospitals NHS Trust

Emergency Department Patient Advice Leaflet.

Following examination and x-rays it has been found that your child has a fracture of one or both bones in the forearm or wrist area. This is a common injury in children. The fracture sustained by your child had caused a deformity to the bones in the forearm and wrist.

Treatment
Your child should have received pain medication either at triage or soon after, usually a strong painkiller which is sniffed up the nose (Intranasal diamorphine or fentanyl)

The treatment of choice for the majority of these deformed forearm and wrist fractures is early manipulation and plaster application to straighten the bones which will allow healing over the next 6 weeks.

If it is decided that your child and the injury is suitable for this management the doctor will explain the procedure to you and your child to ensure you are happy to proceed. A nurse will attend to provide more pain medication if needed and will show your child how to use Entonox ("gas and air").

Once the procedure has been completed and the plaster is in place, a repeat x-ray will be done to ensure adequate positioning of the bones, and the doctor will re-examine the finger movements and to ensure the nerve and blood supply has not been damaged.

What are the risks?
In most cases the procedure is straightforward and tolerated well by children.

The pain relief administered can occasionally cause nausea and vomiting, light-headedness and drowsiness.

If the procedure is too painful and your child becomes unacceptably distressed or you are not happy to continue the procedure it will be stopped, if this is the case your child is likely to need to be admitted and undergo a general anaesthesia to carry out the manipulation, the doctor will tell you if this is the case.

If following the manipulation and plaster application the positioning of the bones is not acceptable on the repeat x-ray, again it is likely that your child will need to be admitted to repeat the procedure under a general anaesthetic, the doctor will tell you if this is the case.

What happens afterwards?
If the repeat x-ray shows acceptable positioning of the bones, then your child will be discharged 1 to 2 hours after the procedure. You will be provided with a fracture clinic appointment for review of the injury and healing by the trauma & orthopaedic (T&O) team. You will be advised of what pain medication to administer, regular paracetamol and ibuprofen at the correct dose for the age of your child is usually adequate.

If the pain worsens and is severe and is not controlled by the pain medication, or your child develops pins and needles or numbness or you have any other concerns, please contact the T&O registrar through switchboard on 01905 763333 and ask for bleep 420 and they will advise you of what to do. If you are asked to return or you decide to return to the ED due to a concern relating to the injury, you will be seen by the T&O doctor either in their clinic or in the ED.

Contribution List

Contribution List

This key document has been circulated to the following individuals for consultation;

Designation
Dr J Walton – Deputy CMO
Dr D Raven – DMD Urgent Care
Dr R Hodson – CD Emergency Medicine WRH
Dr A Jalil – CD Emergency Medicine AH
Donna Jeynes – Matron EM WRH
Marc Tarrant – Matron EM AH
Dr J France – EM Consultant
Dr B Williams – EM Consultant
Dr N Turley – EM Consultant
Dr B Singh – EM Consultant
Dr F Fasih – EM Consultant
Dr T Naqvi – EM Consultant
Dr M Khan – EM Consultant
Dr M Qureshi – EM Consultant
Dr R Khan – EM Consultant
Dr S Malik – CSL for Trauma – on behalf of the Trauma & Orthopaedic Team
Tracey Dennehy – Lead Nurse Practitioner for Trauma & Orthopaedic Team

This key document has been circulated to the chair(s) of the following committee's / groups for comments;

Committee

Supporting Document 1 - Equality Impact Assessment Tool

. To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form on next page;

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	×	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	**Dr Catrin Dyer**

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
Date assessment completed			

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title:** Management of Paediatric Forearm and Wrist Fractures Requiring Manipulation			
What is the aim, purpose and/or intended outcomes of this Activity?	See main body of document			
Who will be affected by the development & implementation of this activity?	❑ ❑× ❑	Service User Patient Carers Visitors	❑ ❑ ❑ ❑	Staff Communities Other _____
Is this:	❑ Review of an existing activity ❑× New activity ❑ Planning to withdraw or reduce a service, activity or presence?			

What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	See body of document
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	See body of document
Summary of relevant findings	See body of document

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
Age		×		
Disability		×		
Gender Reassignment		×		
Marriage & Civil Partnerships		×		
Pregnancy & Maternity		×		
Race including Traveling Communities		×		
Religion & Belief		×		
Sex		×		
Sexual Orientation		×		
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic		×		

Equality Group	Potential positive impact	Potential neutral impact	Potential negative impact	Please explain your reasons for any potential positive, neutral or negative impact identified
deprivation, travelling communities etc.)				
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)	×			

Section 4

What actions will you take to mitigate any potential negative impacts?	Risk identified	Actions required to reduce / eliminate negative impact	Who will lead on the action?	Timeframe
	N/A	.		
How will you monitor these actions?				
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)				

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	
Date signed	
Comments:	
Signature of person the Leader Person for this activity	
Date signed	
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	
2.	Does the implementation of this document require additional revenue	
3.	Does the implementation of this document require additional manpower	
4.	Does the implementation of this document release any manpower costs through a change in practice	
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval.