

## Management of Rib Fractures

Rib fractures are common injuries. Whilst the pain from a single rib fracture is usually quite easy to control, the significant pain associated with multiple rib fractures is much more difficult to manage. Multiple rib fractures are also usually associated with other injuries. Severe acute pain following multiple rib fractures can lead to complications such as chest infection due to inability to deep breathe and cough, increased length of stay and, therefore, increased health care expenditure. Mortality can be directly correlated with the number of ribs fractured and patients sustaining four or more have been deemed at greater risk (1,2). The use of multi-modal therapies for the management of rib fracture pain has become more common and include the use of oral and parenteral analgesics and regional anaesthetic techniques.

Good management is around:

1. Early and effective Pain Management
2. Early referral to Physiotherapy
3. Monitoring
4. Escalation for rib fracture fixation (where appropriate)
5. Considerations in the Elderly

Patients who sustain a number of isolated rib fractures can be easily and well managed in a Trauma Unit and do not necessitate a transfer to the Major Trauma Centre (MTC). However, in the context of an unstable patient with a severe chest injury e.g. large haemothorax with ongoing bleeding or poly trauma the usual mechanism of referral to the MTC should be adhered to.

### 1. Pain Management

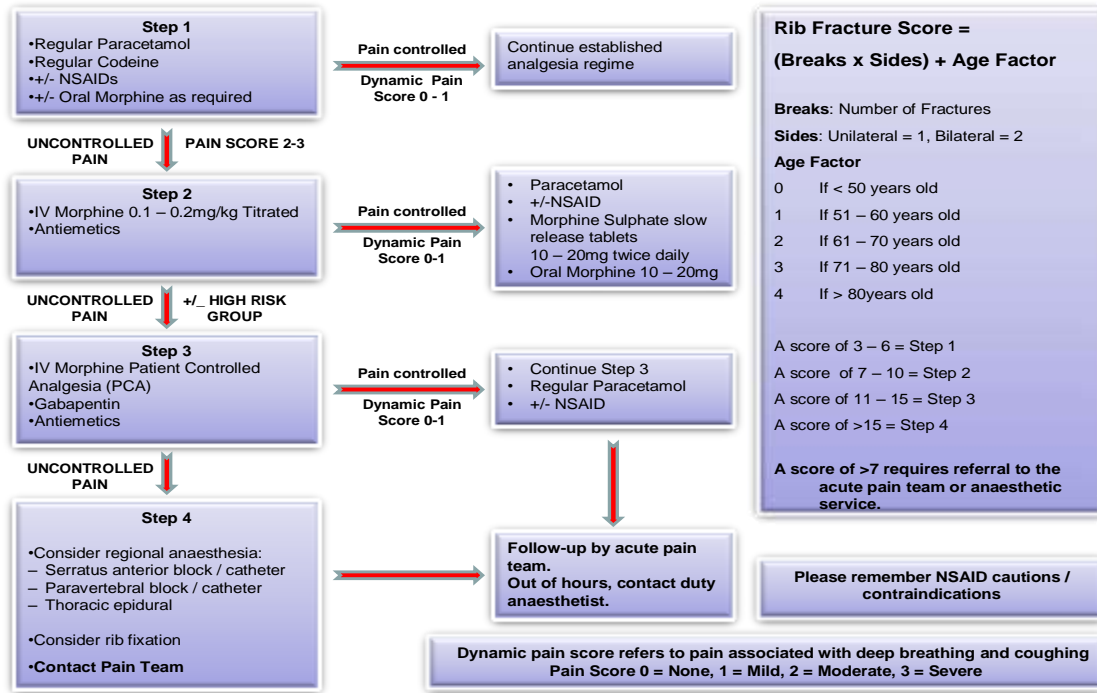
The algorithm below details an evidence based acute pain management pathway developed by the UHCW NHS Trust Acute Pain Service.

Calculation of a rib fracture score will give an indication of which step to commence analgesia at.

Local acute pain services should be utilised to provide additional input.

A rib fracture score should be calculated and analgesia should be commenced as soon as possible in the Emergency Department.

**UHCW NHS Trust Acute Pain Team**  
**Multiple Rib Fracture Pain Management Algorithm**



CH/SM/LM 09/14

**2. Physiotherapy**

Respiratory Physio and mobilisation should be commenced as soon as possible to try and prevent further deterioration, this includes out of hours as necessary.

Below is attached the UHCW NHS Trust Physiotherapy Management of Multiple Rib Fractures Clinical Guideline which has been developed by the Cardiothoracic Physiotherapy Team. This provides a useful tool for the screening, treatment and escalation of patients.

**Physiotherapy Management of Multiple Rib Fractures.**

**REFERRAL CRITERIA.**

Any inpatients with 2 or more rib fractures should be referred to Physiotherapy for screening and treating as appropriate.

Patients with single rib fracture impacting on co-morbidities/ requiring high levels of oxygen support or deemed to be sputum retaining can be managed using this guidance.

(Note - also consider the impact of sternum fractures with or without rib fractures. They can be extremely painful and are likely to impact on respiratory function and ability to use walking aids due to the sternum’s role stabilising the thorax and upper limb function).

## MANAGEMENT CONSIDERATIONS.

### **Ensure pain relief is optimised.**

- **Deep breathing exercises;**
  - If unsure if adequate lung volumes are being achieved give the patient a spirometry incentive spirometer.
  - Other potential treatment options dependant on contraindications include:
    - PEP
    - IPPB
    - Nippy clearway.
  
- **Cough following breathing exercises;**
  - This should be strong and effective in clearing secretions.
  - If pain is limiting cough effectiveness teach the patient to support their ribs using a towel/sheet.
  - If pain still limits cough liaise with;
    - Ward nursing staff to ensure all prescribe pain relief has been given.
    - Bleep pain team (weekdays) or anaesthetist on call (weekends).
  - If pain is adequately controlled but the patients' cough is still ineffective other treatment options, dependent on contraindications include;
    - PEP
    - Cough assist.
  
- **Humidification;**
  - All oxygen should be humidified, either via aquapak or a heated humidified circuit.
  - If the patient is able, encourage adequate systemic hydration
  - Consider getting saline nebulisers prescribed.
  - If all of the above has been tried and the patient is still struggling to clear secretions, consider liaising with the medical team regarding prescription of mucolytics.
  
- **Mobilisation;**
  - Provided there are no red flags/ management restrictions mobilise this patient group **ASAP.**
  - If you are unable to mobilise the patient ensure you optimise their position in the bed/chair prior to starting treatment.
  
- **Patient Education;**
  - To increase the chance of the patient being compliant with completing their exercises independently ensure you explain to them why the exercises are important and give them a 'Patient information – broken ribs' sheet

## ESCALATION PLANS.

Patients with multiple rib fractures can take a couple days to clinically show signs of deterioration and should therefore be monitored.

- Clinical signs of deterioration which indicate the need for **further physiotherapy assessment and potential escalation of intervention** include:
  - ↑ FiO2 requirements
  - ↓ SpO2
  - ↑ Respiratory rate
  - Any sign of infection
    - ↑ HR
    - ↑ Temperature
    - ↑ WCC
    - ↑ CRP
  - ↓ volumes being achieved with the incentive spirometer
  - ↑ drowsiness
  
- If a patient is showing signs of deterioration and you are concerned you should discuss their management with one or more of the following teams:
  - Ward nursing staff
  - Ward medical team/nurse practitioners
  - Pain team
  - On call Anaesthetist
  - Respiratory physiotherapy team
  - Critical Care Outreach Team

Please also see attached a copy of the patient information leaflet for patients which you are free to use.

## Patient Information

# Physiotherapy: Broken Ribs

You have been given this information because you have been diagnosed with broken ribs. Your rib injuries should heal themselves, though this may take as long as two or three months. You may experience significant pain and this may increase for the first few days after your injury.

## The importance of deep breathing and coughing exercises with broken ribs:

Most problems after breaking your ribs will relate to your lungs. Due to pain around your chest, your breathing may be shallow, and your cough may be weak. This can cause phlegm to build up in the lungs, which can lead to a chest infection or pneumonia.

You will be advised to do deep breathing exercises (see below) by your medical team, nursing team or physiotherapist. Please do these exercises regularly to minimise the risk of you getting a chest infection.

### Breathing exercises

- Carry out your breathing exercises each waking hour throughout your hospital stay.
- Your nurse or physiotherapist will show you the positions in which to do the exercises. This will usually be sitting, in the upright position if your other injuries allow this.
- Breathe slowly in through your nose and out through your mouth. Breathe in fully, drawing air to the bottom of your lungs. **Do this six times, holding every third breath for five seconds.**
- Cough deeply from your stomach to your throat.
- You may or may not cough up some phlegm.
- If you cough up some phlegm spit it into a pot or tissue and repeat the cycle until you are no longer coughing up any phlegm.
- **Repeat the exercises every waking hour.**
- If pain is preventing you from performing these exercises regularly, do inform your nurse so that you receive the right amount and type of pain relief.

### Walking (under guidance from your medical team/ nursing team/ physiotherapist)

When your condition allows, nursing staff or the physiotherapist will help you to sit in a chair and to walk. This may be on the day of your hospital admission. You may have oxygen, drips and drains attached but this should not stop you getting out of bed with support from staff.

Once your ability to sit out in a chair and walk on the ward by yourself has been assessed, aim to sit out at regular intervals and complete regular short walks throughout the day. Gradually increase the distance as you are able. If you have any concerns or queries regarding your exercises then please ask your nurse/ physiotherapist for advice.

(Document History - Author: Karen Tomlinson. Department: Physiotherapy at the University Hospitals Coventry & Warwickshire).

### 3. Monitoring

Oxygen administered should be humidified.

Repeat imaging of the chest 24-48 hours following admission should be considered.

Patients who require regional anaesthesia should be managed in the appropriate ward setting with staff who are competent to care for this method of analgesia.

Early referral to HDU / ITU should be considered for patients who shown signs of deterioration.

### 4. Rib Fracture Fixation

Polytrauma or unstable trauma patients requiring hyperacute transfer to the MTC for urgent intervention should be admitted via Resus the usual way by calling the regional Trauma Desk and asking to speak with the On Call ED Consultant at UHCW.

Patients with an isolated chest injury involving the following can be referred to the MTC for consideration for rib fracture fixation. These are the patients that may be suitable:

- Flail segments involving 4 or more ribs  
or
- Multiple (more than 2) displaced rib fractures

The patient should be managed in the Trauma Unit with adequate analgesia, usually in the form of an epidural / regional block or PCA in an appropriate ward / HDU area. We are working on a formal referral process for rib fracture fixation but in the meantime please consider the following:

- For urgent concerns regarding isolated chest injuries, please discuss via UHCW switchboard 02476964000 with the Cardiothoracic Registrar On Call.
- For patients already ventilated or stable with adequate analgesia insitu, queries over rib fracture fixation should be directed to the On Call T&O Registrar. They will refer the patient to one of the Orthopaedic Consultants who performs the fixation. The response time for fixation would normally be 24-48 hours.
- During working hours Mon-Fri the Major Trauma Coordinators can be contacted on bleep 1405 via switchboard or the Pain Service bleep 2493 who will be happy to assist in ensuring the referral is received.
- Please ensure that 3D CT Scan reconstructions of the chest have been performed and sent across for review via the Image Exchange Portal under the CETN Node.

## 5. Considerations in the Elderly

The following information has been taken from the *Assessment and Management of Pain in Older People Clinical Guideline CG 1782* from University Hospital Coventry & Warwickshire.

Prevalence of persistent pain in older people increases with advancing age and is under-recognised and under-treated. Older people may be reluctant to acknowledge and report pain.

Prompt referral according to the above rib fracture algorithm is important so that effective analgesia can be implemented as soon as possible.

Factors that can combine to make effective pain control more difficult in the elderly compared to younger age groups are included in guidance below:

**Age- related changes** that occur in pain perception and the neurophysiology of nociception

**Pharmacokinetic and pharmacodynamic changes** requiring alterations in some drug regimes: The physiological changes associated with aging are progressive and may decrease the dose of drug required for pain relief and/or lead to an increased accumulation of active metabolites.

**Assessing pain becomes more challenging in the presence of severe cognitive or speech impairment** and can be further complicated by language and cultural barriers. Cognitive impairment including confusion during acute illness or in the postoperative setting, with associated diminished memory may result in a decrease in the number of pain complaints and reported pain intensity leading to under-treatment of pain.

**Self-report.** Attempts should be made to obtain self-report of pain from all patients

**Patients with mild to moderate cognitive impairment may need more time** (compared to the cognitively intact) to understand and respond to questions regarding pain. Immediate reports of present pain may be reasonably accurate and as valid as those of cognitively intact patients but recall of past pain is likely to be less reliable

**Other observations for signs of pain in older people with cognitive or communication impairment include:**

- Autonomic changes
- Facial expressions
- Body movements

- Verbalisations/vocalisations
- Interpersonal interactions
- Changes in activity patterns
- Mental status changes
- Proxy reports: Credible information can be obtained from family members, caregivers and those who know the patient well but discrepancies do exist between self-report of pain and external observer judgements of pain intensity with family members over-estimating and healthcare providers under-estimating pain intensity. Therefore, judgements by care-givers are considered to be *proxy* assessments of pain intensity and should be used in combination with other evidence whenever possible.

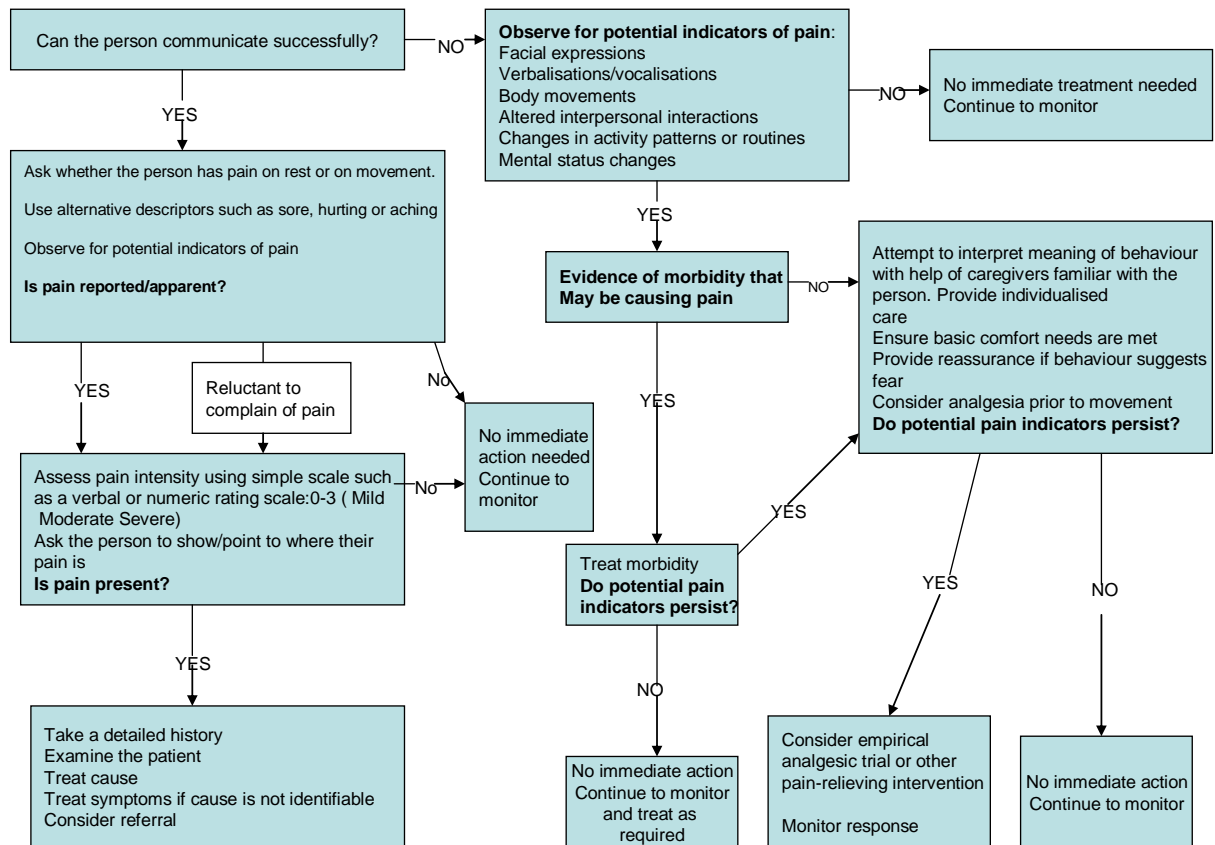
**Re-evaluation:** Once a suitable assessment tool has been identified, serial assessment should be undertaken using the same.

**Search for potential cause:** careful physical examination should be undertaken to identify any treatable causes. Staff should be aware that pain can exist even if physical examination is normal.

**Consideration of empirical analgesic trial or other pain-relieving intervention:** An empirical analgesic trial should be considered if there are pathologic conditions or procedures likely to cause pain or if pain behaviours continue after attention to basic needs and comfort measures. Provide an analgesic trial and titration appropriate to the estimated intensity of pain based on the patient's pathology and analgesic history and monitor response carefully.

#### **Algorithm for the assessment of pain in older people**





## References

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