INTRODUCTION

All children in pain need analgesia[1], regardless of age or situation.

Pain is one of the commonest symptoms in patients presenting to ambulance services.

Control of pain is important not only for humanitarian reasons but also because it may prevent deterioration of the child and allow better assessment.

There is no excuse for leaving a child in pain because of lack of necessary skills in the clinician. If necessary, suitable expertise should be sought to provide pain relief.

Pain is a multi-dimensional construct (***see Table 1***).

Table 1 – Dimensions of pain.

Pain consists of several elements:	Pain relief will depend on:
• Treatment of the underlying condition. • Psychological support and explanation. • Physical methods e.g. splinting. • Pharmacological treatment.	• Cause, severity and nature of the pain. • Age of child. • Experience/knowledge of the clinician. • Distance from receiving unit. • Available resources.

ASSESSMENT

An assessment should be made of the requirements of the child. Pain is a complex experience that is shaped by gender, cultural, environmental and social factors, as well as prior pain experience. Thus the experience of pain is unique to the individual.

It is important to remember that the pain a child experiences cannot be objectively validated in the same way as other vital signs. Attempts to estimate the child's pain should be resisted, as this may lead to an underestimation of the child's experience. Several studies have shown that there is a poor correlation between the patient's pain rating and that of the health professional's, with the latter often underestimating the patient's pain.[2]

Instead, Ambulance Clinicians need to seek and accept the child's self-report of their pain. This is reinforced by a popular and useful definition of pain: "pain is whatever the experiencing person says it is, existing whenever he/she says it does."[3]

All children in pain should have their pain assessed for its nature, severity, duration, location and radiation and any factors that exacerbate or improve the pain.

Pain scoring

There is no validated method of pain scoring for children in the pre-hospital environment. It is suggested that, pending this, a method that has been validated in the paediatric emergency department (ED) setting is used. The Wong and Baker "faces" (scoring **0** = no hurt, **1** = hurts little bit, **2** = hurts little more, **3** = hurts even more, **4** = hurts whole lot, **5** = hurts worst) (***see appendix 1***)[4] are useful for younger children, as is the Alder Hey Triage Pain Score (AHTPS) (***see Appendix 2***). The AHTPS is a valid measure with good inter-observer rateability for use in EDs.[5] The trend in the scores is more important than the absolute value in assessing efficacy of treatment. Scoring will not be possible in all circumstances (e.g. cognitively impaired individuals, communication difficulties, altered level of consciousness) and in these circumstances behavioural cues will be more important in assessing pain.

MANAGEMENT

Analgesia should normally be introduced in an incremental way, considering timeliness, effectiveness and potential adverse events.

Generally this should always include the *non-pharmacological* methods of treatment as a starting point and background to all pharmacological therapy.

However, it may be apparent from the assessment that it is appropriate to start with stronger analgesia because of the child's condition; for example, a child with bilateral fractured femurs is likely to require vascular access to provide circulatory replacement and will be in severe pain. It would, therefore, be inappropriate to try paracetamol and ibuprofen and wait for them to work. Intravenous morphine would be indicated at an early stage, along with non pharmacological methods of pain control. However, a child with a small superficial burn might try paracetamol with or without ibuprofen.

Entonox should be supplied until the other drugs have had time to take effect, and, if the child is still in pain, other analgesics administered. Administering analgesia in this step-wise, incremental way minimises the amount of potent analgesia that is required.

Any pain relief must be accompanied by careful explanation, involving the child, where possible, and the carer. Include details of the child's condition, the pain relief methods being used, and any possible side-effects.

Children with chronic pain, including those receiving palliative care, may experience breakthrough pain despite their usual drug regime. They may require large doses of analgesics to have significant effect. If possible, contact should be made with the team caring for the child.

NON-PHARMACOLOGICAL METHODS OF PAIN RELIEF

Treating the Cause

Many conditions produce pain and it is vital to treat the cause of the pain, including underlying conditions. This will also help relieve the pain in many situations, e.g. giving oxygen in sickle cell crisis.

Table 2 – Non-Pharmacological Methods of Pain Relief.

Psychological	***Fear and anxiety*** worsen pain and a *child friendly environment* (for example removing equipment which may cause fear and having toys or child friendly pictures around) may go a long way towards alleviation of pain. The ***presence of a parent*** has been shown to reduce the unpleasantness of hospital emergency procedures more than any other single factor and there is no reason why this should not be true in the pre-hospital setting. ***Distraction*** (toys, stories, games etc.) is a potent analgesic – whatever is to hand may be used, but there is no substitute for forward planning.[1]
Dressings	Burns dressings that may cool, such as those specifically designed for the task[6] or cellophane wrap, can alleviate the pain in the burnt or scalded child. Burns should not be cooled for more than 20 minutes total time and care should be taken with large burns to prevent the development of hypothermia.[7]
Splintage	Simple splintage of fractures may provide pain relief as well as minimising ongoing trauma and bleeding.

NOTE: These should be part of all other methods of pain relief.

PHARMACOLOGICAL METHODS OF PAIN RELIEF (*refer to specific drug protocols*)

Table 3 – Pharmacological Methods of Pain Relief (***refer to specific drug protocols***).

Topical analgesia	It is no longer acceptable to consider the pre-hospital portion of the child's treatment in isolation. The child is on a pathway of care, from the pre-hospital scene to the most appropriate setting within the hospital. Care that can be improved by one sector (pre-hospital) to enhance the quality of another (hospital cannulation) should be provided. Local anaesthetic agents such as **tetracaine gel 4%** can be applied to the skin overlying a suitable vein and the area covered with an occlusive dressing if it is thought likely that the child will require (further) venepuncture on arrival in hospital. Such an application takes about 20-30 minutes to work.
Oral analgesia	**Paracetamol** and **ibuprofen** may be used in isolation or together for the management of mild to moderate pain. **Oral morphine solution** may also prove very effective in the child with moderate to severe pain such as a fractured forearm, but has the disadvantage of delayed onset, some unpredictability of absorption and having to be given in a set dose. It has the advantage of avoiding the need for intravenous access. Those with severe pain are best treated with an intravenous preparation, augmented with entonox if required.
Inhalational analgesia	**Entonox (50% Nitrous Oxide 50% Oxygen)** is a good analgesic for children who are able to self-administer and who can rapidly be taught to operate the demand valve. It is rapid acting but has a very short half life, so the analgesic effect wears off rapidly when inhalation is stopped. It can be used as the first analgesic whilst other pain relief is instituted. It can also be used in conjunction with morphine, particularly during painful procedures such as splint application and patient movement. Quite young children, providing they can be taught to operate the demand valve, and the child's fear of the noise of the gas flow and the mask can be overcome, can use the system. Flavoured (e.g. bubblegum) clear masks may help the child overcome the fear.
Parenteral and enteral analgesia	**Morphine** remains the gold standard for analgesia and can be administered intravenously, intraosseously, and orally (***refer to morphine drug protocols***). Opiate analgesics should be given intravenously rather than intramuscularly to avoid erratic absorption. As with the other opiates, morphine is reversed by naloxone. When administering opiates to children naloxone **MUST** be available and the required dose calculated in case urgent reversal is necessary. If clinically significant sedation or respiratory depression occurs following the administration of opiates, the child's ventilation should be assisted. Decisions to reverse the opiate effect using an opiate antagonist such as naloxone should be made cautiously as this will return the child to their pre-opiate pain level. Intranasal opiates (morphine, diamorphine and fentanyl) are not currently approved for Paramedic administration. Intranasal opiate analgesia is becoming used more frequently in hospital[8] and has the advantage of potent, rapid action without needing parenteral administration. There is no evidence that metoclopramide is effective in relieving nausea induced by opiates. Children have a significant risk of dystonic reactions with metoclopramide and therefore it is not advised in these circumstances.

PAIN RELIEF WHICH REQUIRES APPROPRIATELY TRAINED DOCTORS

These methods are included because it is necessary to know what can be done to reduce pain in children before hospital, if time and logistics allow. A suitably trained (immediate care trained) Doctor should be called early to the scene if it is thought that such assistance may be necessary. Hospital personnel may not all have these skills.

Table 4 – Pain Relief Methods Which Require Appropriately Trained Doctors.

Ketamine analgesia/ anaesthesia	**Ketamine** is particularly useful in entrapments where a child can be extricated with combined analgesic and sedative effects. At present only Doctors may administer ketamine. Ketamine is a non-opiate, parenteral analgesic that at higher doses is a general anaesthetic agent. It is particularly useful in serious trauma because it does not significantly depress blood pressure or respiration. Older children in particular may experience unpleasant emergence phenomena but these tend to be less common in the young. Ketamine produces salivation so careful airway management is important, although unnecessary interference should be avoided as laryngospasm may occasionally occur. Atropine may be used concurrently to minimise hypersalivation.
Regional anaesthesia	There is limited room for regional nerve blocks because of the environment and the need to transport the child to hospital in a timely manner. However, they can be very effective in certain circumstances of severe pain and do not induce drowsiness or disorientation. Femoral nerve blocks may be useful and provide good analgesia for a lower limb injury such as a fractured femur. Clinicians undertaking regional anaesthesia must be suitably trained, prepared and experienced.

Table 5 – Pre-hospital analgesic drugs used in children.

Drug	Route	Pain Severity	Advantages	Disadvantages
Tetracaine gel 4%	Topical	N/A	Reduces pain of venepuncture.	Takes at least 20 minutes to work.
Paracetamol	Oral, Rectal	Mild-moderate	Not currently parenteral. Well accepted, antipyretic.	Slow action.
Ibuprofen	Oral	Mild-moderate	Moderately good analgesic, antipyretic and anti-inflammatory.	Slow action. May cause bronchospasm in asthmatics.
Entonox	Inhaled	Mild-moderate	Quick, dose self regulating.	Fear of mask. Understanding, coordination and cooperation equired.
Oral morphine	Oral	Moderate-severe	Good analgesic for minor/moderate injuries.	May need to adjust dose of IV morphine if given subsequently. Slow action.
Morphine	Intravenous Intraosseous Intranasal[1]	Severe	Rapid onset. Easily reversed with naloxone. Some euphoria.	Need access. Respiratory depression, vomiting. Controlled drug.
Diamorphine[1]	Intranasal Intravenous Intraosseous	Severe	Intranasal – quick and effective.	As for morphine if given IV. More euphoria. Intranasal not currently approved for Paramedics.
Ketamine[1]	Intravenous Intramuscular	Severe	Can be increased to general anaesthesia in experienced hands. No respiratory depression.	Emergence phenomena, salivation, occasional laryngospasm.

[1]Currently not approved for Paramedic administration. Doctor administration only.

Key Points – Management of Pain In Children

- All children in pain need analgesia.
- The method of pain relief used will depend on the cause, severity, nature of the pain and age of child.
- Analgesia should be introduced incrementally.
- Pain scoring faces are useful for use with young children.
- Morphine remains the gold standard for parenteral analgesia and the appropriate dose of naloxone should also be calculated and available.

REFERENCES

[1] Royal College of Paediatrics and Child Health. Prevention and Control of Pain in Children. *A Manual for Health Care Professionals* London: BMJ Publishing Group, 1997.

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[6] Castner T, Harz C, Schloer J. Cooling – Out of the Bag: Rescue Service 2002.

[7] Allison K, Porter K. Consensus on the pre-hospital approach to burns patient management. *Emergency Medical Journal* 2004;21:112-114.

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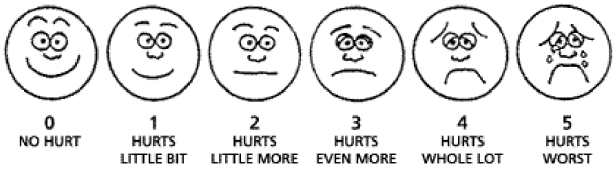
METHODOLOGY

Refer to methodology section.

APPENDIX 1 – The Wong-Baker FACES Pain Rating Scale

This rating scale is recommended for persons age 3 years and older.



Instructions: Point to each face using the words to describe the pain intensity. Ask the child to choose face that best describes own pain and record the appropriate number.

Instructions: Explain to the person that each face is for a person who feels happy because he has no pain (hurt) or sad because he has some or a lot of pain.

Face 0 is very happy because he doesn't hurt at all.

Face 1 hurts just a little bit.

Face 2 hurts a little more.

Face 3 hurts even more.

Face 4 hurts a whole lot.

Face 5 hurts as much as you can imagine, although you don't have to be crying to feel this bad.

Ask the person to choose the face that best describes how he is feeling.

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APPENDIX 2 – Alder Hey Triage Pain Score

Response	Score 0	Score 1	Score 2
Cry or voice	No cry/complaint Normal conversation	Consolable, not talking, negative	Inconsolable Complaining of pain
Facial Expression	Normal	Short grimace <50% of the time	Long grimace >50% of the time
Posture	Normal	Touching/rubbing/ sparing	Defensive/tense
Movement	Normal	Reduced/restless	Immobile/thrashing
Colour	Normal	Pale	Pale "green"

EXPLANATORY NOTES

Cry/Voice	
Score 0	Child not crying; although quiet is vocalising appropriately and noticing surroundings.
Score 1	Child crying but consolable or is excessively quiet and negative towards carer. On direct questioning says it's painful.
Score 2	Child is inconsolable, crying and/or persistently complaining about pain.

Facial expression	
Score 0	Normal expression and affect.
Score 1	Some transient expressions that suggest pain but less than 50% of the time.
Score 2	Persistent facial expressions suggesting pain/distress more than 50% of the time. Grimace – open mouth, lips pulled back at corners, furrowed forehead and/or between eyebrows, eyes closed, wrinkled at corners.

Posture – This relates to the child's behaviour towards the affected body area.	
Score 0	Normal.
Score 1	Exhibiting increased awareness of body area e.g. by touching, rubbing, pointing, sparing or limping.
Score 2	Affected area is held tense and defended so that touching it is deterred, non weight bearing.

Movement	
Score 0	Normal.
Score 1	Movement is reduced or child is noted to be restless/uncomfortable.
Score 2	Movement is abnormal – either very still/rigid or writhing in agony/shaking.

Colour	
Score 0	Normal.
Score 1	Pale.
Score 2	Very pale "green", the colour that is sometimes seen with nausea or fainting/extreme pallor.