Paediatric chronic pain

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Abstract

Chronic pain in childhood is common and if untreated may lead to significant pain-related disability, emotional disturbance and poor school attendance. Many children and adolescents are successfully managed outside of specialist paediatric pain management clinics in a wide range of clinical settings. However, some children require the expertise of a multidisciplinary pain management team in a dedicated paediatric centre. Following multidisciplinary assessment an individualized pain management plan is agreed with the family. Treatment options can be classified into pharmacological, physical and psychological therapies. The aim of treatment is to facilitate a restoration of function for the child, working with the family as a whole.

Keywords Chronic pain; paediatric; pain assessment

Royal College of Anaesthetists CPD Matrix: 2E03, 2D05, 3E00

Learning objectives

After reading the article, you should be able to:

- explain the multidisciplinary assessment of chronic pain in children
- outline non-pharmacological therapies used to treat chronic pain in children
- discuss the commonly used drugs to treat chronic pain in children

Introduction

Although there are many similarities in terms of the assessment and management of children with persistent pain when compared to adult practice, children and adolescents are a distinct group that present different challenges to professionals involved in their care. Persistent pain in the paediatric population is common, particularly in girls. It is important to state that the vast majority of these patients are managed outside of specialist paediatric pain clinics, both in primary and secondary care, making it essential for a wide range of professionals, including pain physicians with a predominant adult practice, to have an appreciation and understanding of pain management principles in this group.

There is a wide variation in the availability and provision of specialist paediatric pain services nationally within the UK. This is common amongst many other developed healthcare systems. Centralization of specialized paediatric services often means there is a significant geographical distance for the family, to a suitable place of treatment which may be a significant barrier to progress if there is no access to suitable local services. As a consequence, untreated persistent pain may lead to significant pain-related disability, emotional disturbance and poor school attendance. Referral to a specialist clinic should be prompted if a child fails to respond to local therapy provision.

Persistent pain in childhood

Children and adolescents are a unique and diverse group. Not only are they dependent on their families and carers financially and practically, but also emotionally. Although adolescence is the peak time for presentation, children of any age may develop chronic pain and exhibit a wide spectrum in terms of their development, understanding and emotional maturity. They are also required to be in appropriate education until they are 18 years old.

Engagement, education and treatment of the family as a unit is fundamental to successful therapy. The child's persistent pain may be related to a chronic medical condition, e.g. juvenile idiopathic arthritis or follow an illness, surgery or trauma such as in complex regional pain syndrome (CRPS). It is sometimes difficult to identify a definite medical explanation for chronic pain presentations in childhood. Headaches, functional abdominal pain and musculoskeletal pain are the most common conditions encountered. It is important to stress that the lack of a medical diagnosis should in no way minimize a professional's appreciation of the severity of the pain or the effect it has on their lives. Terms such as 'psychological pain' are particularly unhelpful and without evidence. Psychological factors undoubtedly play a part in all pain experiences, as explained by the biopsychosocial model of pain. The overall primary goal of pain management is to facilitate a restoration of function, rather than necessarily reduce pain in its own right.

Pain assessment

The gold standard for pain assessment is an initial multidisciplinary consultation with the child and their family, ideally at a single meeting. Local resources, expertise and particular service model will influence which professionals are involved but a typical team will include a pain physician, physiotherapist, clinical psychologist, specialist pain nurse and occupational therapist. Collaboration with a paediatrician in multidisciplinary discussions is imperative, not only for specific medical expertise but for support with potential safeguarding concerns that may arise.

The initial consultation, which usually requires over an hour is an opportunity for members of the team to meet the family, take a detailed history and examine the child. The key components of the consultation are outlined in Box 1. Frequently the team will have a round table discussion after this initial discussion before presenting the family with an individualized pain management plan, tailored to their specific needs and identify potential treatment options.

An initial age appropriate explanation of chronic pain is a key part of this first meeting, which will be built on subsequently by team members. If there is diagnostic uncertainty, then this must be addressed at this point. Repeated investigations, often by multiple medical specialities are frequently encountered by

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Components of initial multidisciplinary consultation

- Parent and child questionnaires prior to meeting, e.g. PedsQL, PI-ED
- Introductions of the team and family
- Explanation of MDT meeting and process of assessment and pain management plan
- Detailed pain history from child and family (using age appropriate language)
  - site, character, intensity, radiation, associated symptoms
  - aggravating and relieving factors
- Identification of pain associated disability
  - poor sleep, reduced activity and social interactions, anxiety, low mood
- Assessment of coping skills, e.g. identify repeated attendances to emergency department
- Other relevant medical history and a developmental history as appropriate
- Investigations and specialist consultations to date
- Establish which therapeutic modalities, including medications have been tried
- Current medications and allergies
- Family structure/domestic situation
- Current school and educational performance/attendance
- Identify other agencies involved e.g. social worker, CAMHS, school nurse (it is useful to seek permission for sharing of information at this point)
- Examination of the child by doctor and physiotherapist
- It is sometimes useful for parents to have an opportunity to speak to a member of the team away from the child, which can often be done before the team discussion)

MDT meet without family

- Confirm all necessary investigations/opinions are complete
- Agree initial pain management plan

MDT meet with family

- Initial pain explanation
- Each member of the team will discuss their contribution to pain management plan
- Family input into plan
- Answer any outstanding questions or concerns

Box 1

children on their journey before they are referred to a specialist clinic. Investigations later on may cause confusion or at worse undermine the success of a pain management approach. There should be an acceptance from the family that no further tests or referrals to other specialities for a 'missed diagnosis' are necessary. This is fundamental in setting the scene of facilitating functional restoration through multidisciplinary pain management, which is a joint responsibility between professionals, the family and the child.

Several health-related quality of life (HRQOL) questionnaires, physical function measures and other questionnaires are frequently used to establish a baseline and repeated at various intervals to determine progress. Specific examples are given in Table 1.

Treatment of chronic pain in children

Broadly speaking, the treatment options for chronic pain can be classified into pharmacological, physical and psychological treatments, as summarized in Table 2. It should be emphasized, however, that although different professionals that make up the team bring their specific skills that are traditional to their discipline, the boundaries are less well defined in practice. For instance, the whole team will employ components of cognitive-behavioural therapy (CBT) in their interactions with the child and their family, yet a smaller proportion will have formal psychological treatment with a clinical psychologist. These techniques are fundamental to such topics as pain education, goal setting, sleep hygiene, distraction and identifying solutions to practical problems like pain flare management.

An understanding of why pain is often persistently experienced in the absence of an identifiable injury or abnormality is essential and some degree of pain education is a necessary

Examples of questionnaires, including health-related quality of life (HRQOL) and physical function measures

Name	Notes
Paediatric Quality of Life Inventory (PedsQL)	Designed for paediatric medical populations. Validated between 0 and 18 years old 4 domains: physical, psychological, social and school functioning
Child Health Assessment questionnaire (CHAQ)	Well established and widely used Long questionnaire
Bath Adolescent Pain questionnaire (BAPQ)	Designed specifically for children with chronic pain
Pain Experience Questionnaire (PEQ)	Designed for children with chronic pain and based on the Multidimensional Pain Inventory May be used in children over 7 years old
Paediatric Index of Emotional Distress (PI-ED)	UK-standardized measure of emotional distress in children. Based on Hospital Anxiety and Depression Score (HADS) used in adults Brief questionnaire — 14 questions. Some centres also use HADS for parents
Timed walk Number of sit-to-stand movements in 1 min	

Table 1

Treatment modalities for chronic pain in children

Pharmacological strategies	Physical treatments	Psychological interventions
Tricyclic antidepressants (TCA) Gabapentinoids • Gabapentin • Pregabalin Topical treatments, e.g. lidocaine 5% medicated plasters Opioids Paracetamol NSAIDs Topiramate	Physiotherapy • therapeutic exercise • hydrotherapy • Graded motor imagery • Mirror box therapy Occupational therapy TENS Heat/cold packs Acupuncture Interventional procedures, e.g. lumbar sympathetic nerve blocks for CRPS	Pain education Activity pacing Goal setting Sleep hygiene Relaxation Distraction Cognitive-behavioural therapy (CBT) Acceptance and Commitment Theory (ACT) Mindfulness

Table 2

component of all pain management plans. This is often delivered as individualized sessions, using age appropriate metaphors and activities such as drawing or play. This message is reinforced at subsequent visits by the team.

Pharmacological strategies

Much of the evidence for medication use in children with chronic pain is extrapolated from our experience with adults and many medications are used outside of their license. Commonly used drugs and appropriate doses are summarized in Table 3. The prescriber should ensure that there is a robust assessment of the efficacy of any analgesic medication given with a plan to wean and discontinue if there is no clear benefit. Adverse effects from medication such as sleepiness and impaired cognitive ability may have a further significant impact on performance and attendance at school, which in turn may compound existing pain related disability and social isolation from peers.

This is particularly pertinent to the use of opioid medications in children for non-malignant chronic pain. In common with adult practice, children frequently present to a pain service on significant doses of opioids that have been escalated to high doses, with correspondingly severe adverse effects. This situation implies that the pain is not opioid sensitive and the medication should be weaned carefully and discontinued. The weak opioid tramadol, which is available as an orodispersible tablet, may be useful in some clinical settings given its other effects on serotonergic and noradrenergic pathways. It also has a 'ceiling' dose of 1–2 mg/kg four times daily, thereby limiting the upper dose, which is more difficult with other opioids such as morphine. A 12-hour modified release preparation also exists – this may provide smoother analgesia or help prevent waking with pain during the night.

Anti-neuropathic drugs such as the tricyclic antidepressants (TCA) and gabapentinoids may be useful for neuropathic pain. Some of the causes of neuropathic pain in children are listed in Table 4. There is also some evidence for the use of TCA in non-neuropathic conditions such as functional abdominal pain. TCA are particularly helpful for their sedative properties and may help restore sleep, but the timing of the dose is important to reduce somnolence; a once daily dose taken approximately 4 hours before bedtime is a sensible starting point. Common side effects such as dry mouth may be less prevalent when the secondary amine nortriptyline is taken instead of amitriptyline due to less anticholinergic effects, although the former is not widely available as a liquid and is significantly more expensive. Amitriptyline is well established in paediatric practice for a number of indications such as enuresis and is generally well tolerated, although sudden death has been reported due to the risk of prolongation of the QTc interval. Some centres routinely perform an ECG prior to commencement of treatment.

Gabapentin has also been widely used in children for epilepsy, neuropathic pain and neuro-irritability. Although pregabalin has a similar effect to gabapentin, the pharmacokinetics of the two drugs are significantly different, allowing twice daily dosing. Employing such prescribing strategies may prevent medication being required during the school day, which can aid compliance and normalize activities while at school. Although liquid

Some commonly prescribed medications for children with chronic pain

Drug name	Dosage guidance	Comments
Amitriptyline Nortriptyline	An initial dose 0.1 mg/kg taken once in the evening. Slowly titrated to a usual maintenance dose 0.2–0.5 mg/kg	Anticholinergic and antihistaminic side effects frequently cause dry mouth and sedation. Daytime somnolence reduced by taking earlier in evening Reduced side effect profile with secondary amines. May prolong QTc interval
Gabapentin	Maintenance dose range 30–70 mg/kg/day in 3 divided doses	Active absorption across gut is saturable reducing bioavailability at higher doses
Pregabalin	Author uses target maintenance dose range 1–2 mg/kg twice daily	Twice daily dosing may aid compliance
Lidocaine 5% medicated plaster	1-3 plasters may be applied to the painful area for 12 h each day followed by 12 h without	Very low systemic absorption 'Cooling effect' on application Provides physical barrier. May cause skin reaction.
Tramadol	1–2 mg/kg 4 times daily	Serotonergic and noradrenergic effects in addition to weak opioid. 12 h modified release preparation also available

Table 3

Causes of neuropathic pain in children and young people

Category	Examples
Central neuropathic pain	Spinal cord injury
	Stroke
	Multiple sclerosis
	Tumours e.g. neurofibromatosis
Trauma/surgery	Complex regional pain syndrome
	Post-surgical scar pain
	Burns
	Phantom limb pain
	Brachial plexus injury
Cancer	Nerve compression or invasion by tumour
	Chemotherapy induced neuropathy
Post-infective	HIV
	Post-herpetic neuralgia
Genetic	Erythromelalgia
Autoimmune	Guillain-Barré syndrome
Hereditary	Charcot-Marie-Tooth disease
	Fabry's disease

Table 4

preparations exist for both gabapentinoids, the contents of the capsules are readily dissolvable in water to allow accurate dosing.

Lidocaine 5% medicated plasters are a non-systemic topical treatment for neuropathic pain, which is very acceptable to children and also provides a physical barrier to the area of pain for the 12 h they are applied each day. They are useful for clinical situations such as CRPS or post-surgical scar pain.

Physical treatments

Table 2 outlines the wide range of modalities that fall under this category, which range from desensitization therapy and the use of therapeutic exercises to invasive interventions such as nerve blocks under anaesthesia.

It is common for children with chronic pain to develop reduced mobility, poor exercise tolerance and reduced physical function. The reasons are multifactorial but may include the development of fear-avoidance patterns of behaviour and general de-conditioning due to lack of exercise. For instance, physiotherapists may help children reach their goal of improved movement and function through therapeutic exercises or general conditioning activities. They may also employ specialized rehabilitative techniques such as graded motor imagery and mirror box therapy.

Transcutaneous electrical nerve stimulation (TENS) is a safe inexpensive treatment with no systemic side effects, which some children find extremely useful in managing their pain, especially as it is a form of pain relief that they can control and administer themselves. Other physical treatments such as hot and cold packs and acupuncture are sometimes used.

The role of interventional procedures in children is less clear than in adult practice. Invasive treatments such as lumbar sympathetic nerve blocks or continuous local anaesthetic infusion catheters are sometimes used to facilitate physiotherapy by providing an 'analgesic window' in some children with CRPS. Personally I believe these interventions do have a place in the management of a limited number of children who require pain relief to perform their physical therapy and are otherwise engaged in multi-disciplinary treatment. Each individual case must be considered carefully, particularly as the child will usually require general anaesthesia to perform the block.

Psychological interventions

CBT is the most well-known psychological therapy for treatment of chronic pain. In essence, CBT is a time-limited therapy that focusses on linking how a person's thoughts and beliefs affect how they feel and the way that they behave. Acceptance and commitment theory (ACT) is a more recent form of psychotherapy used in some centres. Rather than placing an emphasis on controlling or changing the pain experience it uses acceptance and mindfulness techniques to develop an acceptance of pain and live life according to the person's core values.

A pain management programme, which may involve residential treatment for several weeks, is an option for some children who fail to make progress. ◆

FURTHER READING

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