

Management of chronic pain conditions in Pediatric population

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Abstract

Pain is an inherently subjective experience and should be assessed and treated as such. Pain has sensory, emotional, cognitive, and behavioral components that are interrelated with environmental, developmental, and sociocultural factors. Suffering occurs when the pain leads the person to feel out of control, when the pain is overwhelming, when the source of the pain is unknown, and when the pain is chronic. The concepts of pain and suffering go well beyond that of a simple sensory experience⁽¹⁾.

INTRODUCTION

Chronic pain is a significant problem in the pediatric population, conservatively estimated to affect 15% to 20% of children⁽²⁾. Although the upper age limit used to define the pediatric population varies among experts, but children up to the age of 12 years are consistent with the definition found in several well-known sources⁽³⁾.

The financial costs of childhood pain also may be significant in terms of healthcare utilization. Chronic pain accounts for greater total annual costs than other chronic conditions, including heart disease, hypertension, and diabetes, as well as other indirect costs such as lost wages due to time off work to care for the child⁽⁴⁾.

Acute pain follows injury to the body and generally disappears when the bodily injury heals. It is often, but not always, associated with objective physical signs of autonomic nervous system activity. Signs of sympathetic nervous system arousal rarely accompany chronic pain, in contrast to acute pain. The lack of objective signs may prompt the inexperienced clinician to say the patient does not “look” like he or she is in pain.

Chronic pain can be differentiated from acute pain in that acute pain signals a specific nociceptive event and is self-limited. Chronic pain may begin as acute pain, but it continues beyond the normal time expected for resolution of the problem, persists, or recurs for other reasons⁽¹⁾.

The International Association for the Study of Pain (IASP)

characterized chronic pain into three types: less than 1 month duration, 1 to 6 months duration, and greater than 6 months duration (formerly chronic pain was defined as having pain for longer than 6 months). It is now recognized that key elements of chronic pain can be evident much earlier.

Chronic pain may include varying amounts of disability, from none to severe, and may be independent of the amount of tissue damage and perceived severity. Biological, psychological, social, cultural, and developmental factors can affect pain-related functioning⁽⁵⁾.

CAUSES OF CHRONIC PAIN IN CHILDREN

Pain due to a previous injury e.g. post amputation phantom limb pain.

Chronic abdominal pain e.g. constipation, intestinal infections, gastritis and lactulose intolerance.

Neuropathic pain. Pain that involves the neural tissues is classified as neuropathic pain and is less responsive to analgesics than pain that involves somatic and visceral tissues. Because young children are unable to describe the quality of pain, presence of neuropathic pain with cancer may be unrecognized and undetected⁽⁶⁾.

CRPS1 or reflex sympathetic dystrophy (RSD) is defined as “continuous pain in a portion of an extremity after trauma which may include fracture but does not involve major nerve lesions and is associated with sympathetic hyperactivity”. RSD is generally seen in children beyond the age of nine.

RSD occurs particularly in girls, commonly overachievers who participate in competitive athletic programs. Pain often persists despite the absence of ongoing tissue injury or inflammation⁽⁷⁾.

Chronic headache. Investigated the incidence of headache in 9000 school-aged children in Sweden, the author estimated that by age of 6 years, 39% of children had suffered from headache. This figure dramatically increased to 70% by age 15 years. Other studies have reported similar trends with an incidence as high as 82%. Headache have a significant impact on the lives of children and adolescents, resulting in school absence and decreased extracurricular activities. The difficulty for the practitioner arises from the fact that the headache may be functional. The degree of headache is modulated by extracranial as well as intracranial structures⁽⁸⁾.

Chronic headache might be due to: chronic progressive headache e.g. organic brain disease and VP shunt malfunction, or chronic nonprogressive headache e.g. functional headache and mixed headache.

The patient's clinical status has to be very carefully evaluated in addition to computed tomography scans with the neurosurgeons. Once it has been confirmed by the neurosurgical service that the headache is not related to increased intracranial pressure, the patient is scheduled for an outpatient evaluation in the Chronic Pain Clinic⁽⁸⁾.

PAIN ASSOCIATED WITH CHRONIC MEDICAL PROBLEMS

Chronic Pain in Sickle Cell Disease

When people think of sickle cell disease, they usually think of pain. The hallmark symptom of sickle cell disease is an excruciatingly painful episode known as a sickle cell crisis. As a result, people with sickle cell disease are often perceived as long-time sufferers, victims of uncontrollable pain crises that can strike without warning. An additional challenge is the fact that individuals with more severe forms

of the disease can become physically dependent on the opioids prescribed to treat their chronic pain. Every sickle cell crisis is different, and each requires an approach that is attentive to the stated needs of the individual. Often, the patient and family should be well informed about the sickle cell specific disease pattern⁽⁹⁾.

Cancer pain in children:

One of the most challenging issues in pediatric pain management is the management of cancer pain, especially in the terminally ill patient. Pain in a cancer patient can result from tumor invasion, procedures like bone marrow aspiration, lumbar puncture, and venipuncture, etc. and therapy-related pain, which is related to the type of tumor, and the anticancer therapy that is being administered⁽¹⁰⁾.

Pain during terminal illness:

Treatment modalities for cancer and children have improved recently. Novel alternative methods for providing analgesia have been used like Nebulized opioids (the nebulization of opioids delivers medication directly into the airways and hence into the pulmonary circulation. Hepatic first-pass metabolism is avoided, and this route has been advocated as causing fewer adverse reactions) or the transdermal delivery systems in children (Transdermal delivery allows continuous systemic application of opioids through the intact skin. The time from application to minimal effective and maximum serum concentrations is 1.2 to 40 hours and 12 to 48 hours, respectively for fentanyl patch. It has fewer gastrointestinal adverse events than other routes of administration) to offset intractable pain. The adverse effects associated with long-term use of opioids include tolerance and withdrawal. Careful rotation of opioids, along with the judicious use of other agents including N-methyl-D-aspartate (NMDA)-receptor antagonists, should be considered in their care. Patient-controlled analgesia (PCA) has been used widely for home-bound patients with terminal cancer. Smaller, more user-friendly pumps (Fig 1) have been devised for easy programming and they require less frequent changing⁽¹¹⁾.

Figure 1

Figure 1: Ambit ® PCA infusion pump()



NSAIDs and steroids are particularly useful in the management of bone pain from metastasis. Carbamazepine, gabapentin and tricyclic antidepressants (TCAs) are useful for the management of neuropathic pain. Hypnosis, biofeedback and distraction techniques can be used very effectively in children who are not heavily sedated. A home care coordinator should be available for the management of any adverse conditions. The combination of various techniques for the management of cancer pain should enhance the child's motivation to lead as normal a life as the disease state allows.

EVALUATION OF CHRONIC PAIN

To effectively treat chronic pain, the APS's statement stresses that physical and psychological manifestations must be viewed together and separating them could lead to inappropriate investigations, procedures, and interventions⁽⁵⁾.

The APS recommends that an evaluation of pediatric chronic pain should include:

A history of the present problem, including a detailed description of the pain detailing onset, development, intensity, duration, location, exacerbating and alleviating factors, and impact on daily life (such as sleeping, eating, school and social interactions).

Assessment of the child and family's perception of the pain's cause and their response to it.

A review of past pain problems in the family and current treatments for the child's pain, including home remedies and alternative treatments.

Observation of the child's general appearance, posture, gait, emotional and cognitive state.

Assessment of muscle spasms, trigger points, and areas sensitive to light touch; and a complete neurological examination.

The objectives of pain assessment are to:

- Detect the presence of pain.
- Estimate the potential impact of pain on the individual.
- Quantify the success of intervention.
- In older children, tools for the assessment of pain involve the patient in self-reporting pain⁽¹³⁾.

There are several self-report measures that can be followed objectively for a prolonged period of time (Table 1).

Figure 2

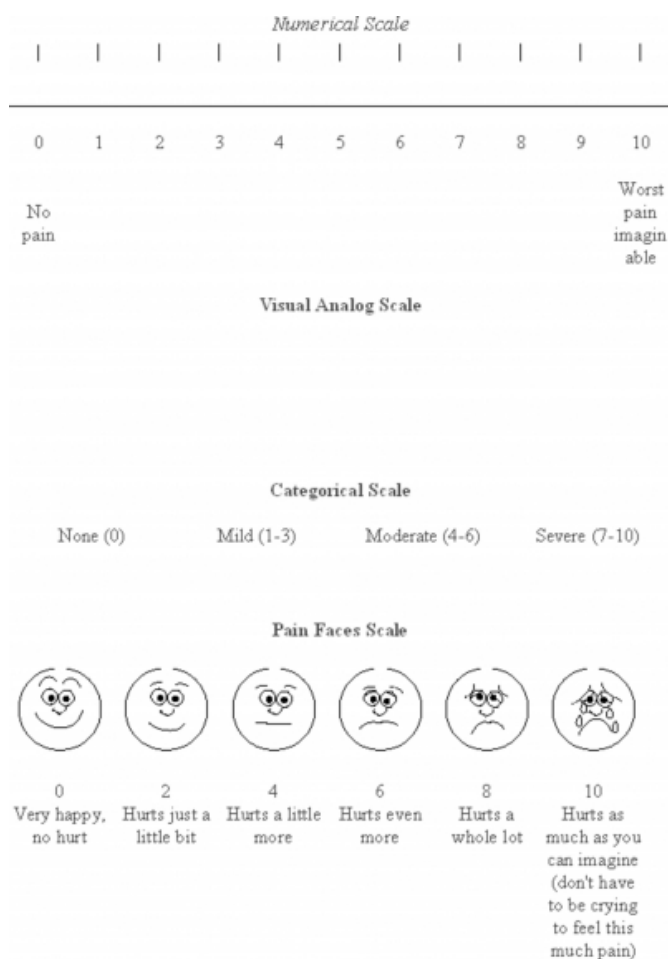
Table 1: Self-Report Measures of Pain in Children

Measure	Description	Age Range	Advantages	Disadvantages
Faces Scale	Faces indicating intensity of pain	6-8 yrs	Adequate test/retest reliability	
Visual Analog	Vertical line with numerical anchors	5 yrs & over	Reliable, valid & versatile Can relate in dimensions	Must understand proportionality
Oucher Scale	6 photos of children indicating pain	3-12 yrs	Presentations of pictorial & numerical range: broader age proportionality	Must understand concept
Pain Diary	Numerical rating along with time, activity medications, etc.	Adolescent	Useful in determining patterns of pain and self-teaching management strategies	Requires commitment

The visual analog score and faces pain scale (Fig 2) are the measures commonly used in the pain clinic. Self-report measures are very useful in determining precipitating and aggravating factors that cause pain in the older child. These also allow us to assess patients for compliance and the viability of treatment regimens. Using these measures, physicians will be able to predict patient pain tolerance and ability to cope with pain⁽¹⁴⁾.

Figure 3

Figure 2: Representative samples of pain intensity rating scales



TREATMENT

Treatment strategies should be based on the findings of the assessment and should address the inciting and contributing factors. A multimodal approach often is more effective than a single sequential treatment approach.

The World Health Organization (WHO) has suggested an analgesic stepladder protocol for the management of pain in cancer patients⁽¹⁵⁾:

WORLD HEALTH ORGANIZATION CANCER PAIN MANAGEMENT

Step 1 Non-opioids & adjuvants

Step 2 Weak opioids; Non-opioids & adjuvants

Step 3 Potent opioids and adjuvants

BASIC PHARMACOLOGIC PAIN MANAGEMENT PRINCIPLES

- Oral or intravenous administration of pain

medication is the Most preferred methods. Avoid intramuscular injections.

- Base the initial choice of analgesic on the severity and type of pain: intravenous opioids Morphine can be safely titrated to effect in the pediatric setting.
- Use Meperidine with caution. Meperidine should not be used in patients with decreased renal function.
- PCA or nurse controlled analgesia (NCA) are acceptable methods of administering pain medications. Patients and families should be educated on PCA delivered medication. Parents should be instructed never to push the PCA button when the child is asleep⁽¹⁶⁾.

Figure 4

Pain Severity	Analgesic Choice	Examples
Mild (pain score 1-3)	Acetaminophen, Nonsteroidal Anti-inflammatory Agents	Tylenol®, ibuprofen (Motrin®), naproxen (Naprosyn®)
Moderate (pain score 4-6)	IV Ketorolac, oral acetaminophen/opioid combinations	Toradol®, Vicodin®, Tylox®, Tylenol® with codeine #3
Severe (pain score 7-10)	Opioids	Morphine, hydromorphone (Dilaudid®), fentanyl

Treatment techniques include education about the pain experience and the pain problem, cognitive-behavioral (e.g., self-regulatory behaviors such as hypnosis or biofeedback) strategies, family interventions, physical interventions (e.g., massage, acupuncture, TENS, physical therapy). Exercise is prescribed to correct impairment, improve musculoskeletal function, and maintain a state of well-being ⁽¹⁷⁾.

Pain is both a physical and psychological experience. Therefore, psychologists, especially those who specialize in treating pain problems, can provide a number of important services to the child with pain:

Self-management techniques for pain: These include relaxation strategies such as deep breathing exercises, muscle relaxation.

Evaluation and treatment for pain-related disability: The psychologist can work with school personnel to find ways of helping a child with pain function in the school environment.

Evaluation and treatment for pain-related emotional difficulties.

Important notes about narcotic treatment in children:

Addiction to narcotics is rare (less than 1% of patients) and usually occurs in patients with a prior history of substance abuse.

Pseudoaddiction must be differentiated from true addiction. Patients experiencing continued pain will exhibit anxiety and drug-seeking behavior. These behaviors typically disappear once the pain is relieved. This pseudoaddictive behavior is extinguished by adequate pain relief, unlike the continued drug-seeking behavior of true addiction₍₁₈₎.

CONCLUSION

Chronic pain in children is the result of a dynamic integration of biological processes, psychological factors, and sociocultural context, considered within a developmental trajectory. This category of pain includes fluctuations in severity, quality, and regularity. Chronic pain can occur in single or multiple body regions and can involve single or multiple organ systems. Ongoing nociception can result in a sensitization of the peripheral and central nervous systems to produce neuroanatomical, neurochemical, and neurophysiological changes. It is important that assessment and treatment strategies be based on this definition and related dimensions.

RECOMMENDATIONS

Opportunities exist for improving pediatric pain management. Pediatricians can facilitate the comfort of their patients by using the following strategies:

- Expand knowledge about pediatric pain and pediatric pain management principles and techniques. madaabiss@yahoo.com
- Provide a calm environment for procedures that reduces distress-producing stimulation.
- Use appropriate pain assessment tools and techniques.
- Anticipate predictable painful experiences, intervene, and monitor accordingly.
- Use a multimodal (pharmacologic, cognitive behavioral, and physical) approach to pain management and use a multidisciplinary approach when possible.
- Involve families and tailor interventions to the individual child.
- Advocate for child-specific research in pain management, Food and drug administration and evaluation of analgesics for children.
- Advocate for the effective use of pain medication for children to ensure compassionate and competent management of their pain.

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