

Management of children pain

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Pain in child patients: A review on managements

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Abstract

Pain has been known as one of the major universal health concerns about ill children, because of its morbidity and potential mortality. Pain suitable evaluation is a challenge in children because the verbalization is difficult. Low clinical information, few pediatric researches, and the worry of opioid side effects make difficult to provide satisfactory treatments. Many pharmacologic and non-pharmacologic strategies to manage pain exist for pediatric pain treatment. The purpose of this review article is to describe exhaustively pain mechanism, evaluation and management by review literature from January 2000 to January 2019 using PubMed, EMBASE, MEDLINE, LILACS databases. Pharmacological and integrative non-pharmacological therapies has been indicated in acute and chronic pain treatment. Opioids and opioid-sparing agents target nociceptive and neuropathic pain. With due attention to available results, an early combination of pharmacological and integrative non pharmacological treatments are indicated in children pain management.

Key Words: Pediatric pain, pain management, pain evaluation, opioid reduction therapy, non-pharmacological therapy

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According to the Institute of Medicine statement on Relieving Pain in America, acute and chronic pain is a major weekend problem in adulthood,¹ but it is a major health concern in ill children, because of its morbidity and potential mortality.² The acute pain is a body response to mechanical and thermal stimuli and to harmful chemical. Usually it is resolved after days or weeks.³ Chronic pain is an unmanageable pain that stands for three or more months, notwithstanding treatment.⁴ Suitable evaluation of pain is a challenge in children because their verbalization is difficult.⁵ Due to low clinical information, too few pediatric researches and worry of opioid side effects make arduous a satisfactory treatment.^{3,6} A large proportion of admitted children have pain, particularly related to surgery.⁷ Indeed, pain recognition and assessment in children is difficult causing undesirable patient results.⁸ Improving analgesia in all patients is mandatory, by training the medical staff according to the World Health Organization (WHO) pain ladder application. Many pharmacologic and non-pharmacologic strategies exists for pediatric pain treatment,⁹ in particular for chronic children pain in abdominal and musculoskeletal diseases, cancer, vaso-occlusive crises, and headaches.^{2,10,11} The basic treatment for acute postoperative pain in children can be performed

with opioids. Opioids are also prescribed in patients with weakening chronic pain conditions.¹² Notwithstanding opioids advantage for management of pain, some side effects such as cognitive dysfunction, constipation, psychiatric comorbidities, and respiratory depression can occur in this therapeutic procedure.¹³⁻¹⁵ Due to these side effect of opioids, multidisciplinary analgesia treatments increased.³ Concurrent use of pharmacological and integrative non-pharmacological treatment may decrease the need of opioid therapy.¹⁶

In this review, we summarize definitions of pain, its mechanisms, evaluation, and managements. A broad search was performed on biomedical and pharmacological bibliographic database such as PubMed, EMBASE, MEDLINE, and LILACS database, global independent network of Cochrane, Science Direct and global health library of Global Index Medicus (GIM). By referencing these databases, a comprehensive literature review was carried out combining the terms: pediatric pain, evaluation, mechanism, management and treatment for articles published from 2000 to 2019. A total of 284 articles were obtained. About 68 of them were deleted due to content not related to the objective of the study. After deleting other weak articles, 30 articles were selected for detailed review based on the fact that

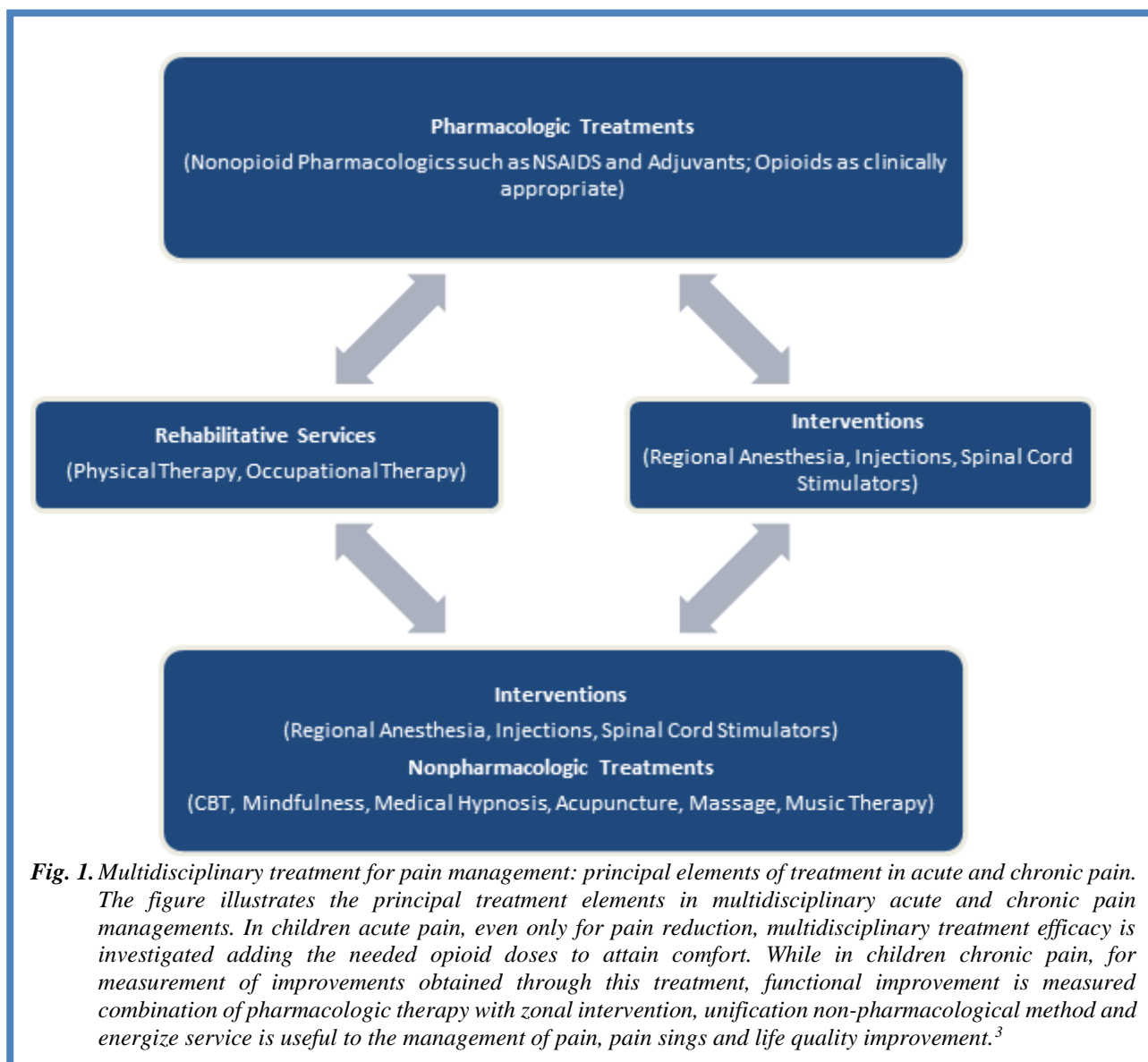


Fig. 1. Multidisciplinary treatment for pain management: principal elements of treatment in acute and chronic pain. The figure illustrates the principal treatment elements in multidisciplinary acute and chronic pain managements. In children acute pain, even only for pain reduction, multidisciplinary treatment efficacy is investigated adding the needed opioid doses to attain comfort. While in children chronic pain, for measurement of improvements obtained through this treatment, functional improvement is measured combination of pharmacologic therapy with zonal intervention, unification non-pharmacological method and energize service is useful to the management of pain, pain sings and life quality improvement.³

they appeared to be good examples of evidence-based medicine (EBM). A multitude of pain definitions exists, producing a very controversial issue.¹⁷ The most accepted is the one of the international association for the Study of Pain (IASP), that is “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”.¹⁸ In humanity and lawful area, pain is recognized as a serious scourge of humanity, therefore, its management is a fundamental human right dictatted by article 25 of the Human Rights. Pain may be also defined as: physical or mental and acute or chronic. Another classification of pain include the terms: musculoskeletal, inflammatory or mechanical/ compressive pain.⁸⁻²¹

Pain is sensory or discriminative, affective or emotional, cognitive and behavioral. The pain follows the sensory system, whose afferent pathways reach the central nervous system and then the efferent pathways. The nociceptors (specialized peripheral sensory neurons) start

ascending pathways when detecting alarming rise of temperature, pressure and injury-related chemicals, sending alerts of potentially damaging stimuli. These stimuli are long-ranging electrical signals that are transmitted to higher brain centers,^{6,22,23} The nociceptors activation and their information may mediate pain sensations.^{22,24} The ascending pathways activate several neural center: paleospinothalamic, archispinothalamic and neospinothalamic tracts.^{7,24} All these pathways have first-order neurons that are placed in back root ganglion. Each pathway originates from different areas of the spinal cord and reaches the central nervous system (CNS).^{6,25} The CNS is the detector and interpreter of several irritant mechanical, chemical and thermal stimuli. When intense, these stimuli elicit pain. If damaging conditions persist, pain produces hypersensitivity.^{7,26,27} Data on place, quality, intensity and time of pain, are processed by the sensory system while other systems cooperated to understand perceived pain.^{28,29} Eventually,

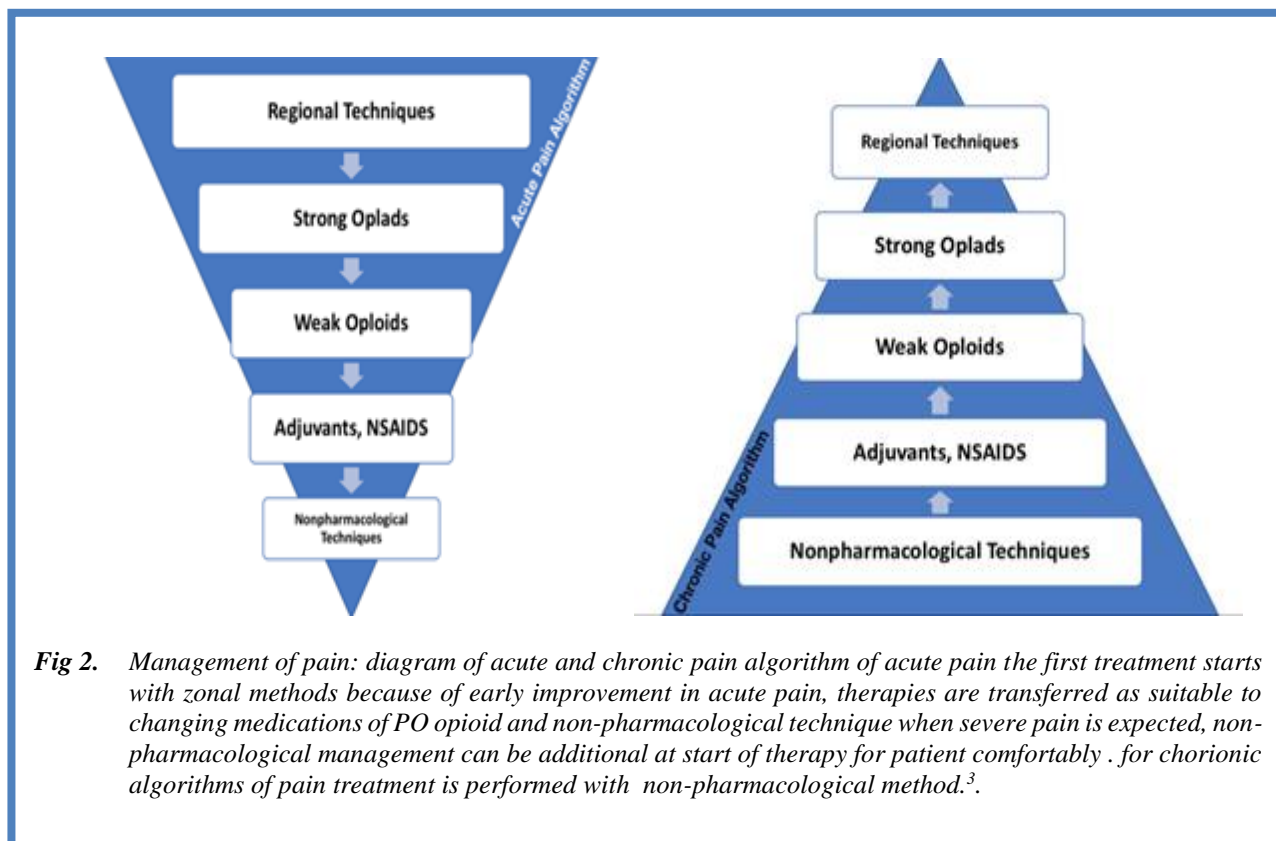


Fig 2. Management of pain: diagram of acute and chronic pain algorithm of acute pain the first treatment starts with zonal methods because of early improvement in acute pain, therapies are transferred as suitable to changing medications of PO opioid and non-pharmacological technique when severe pain is expected, non-pharmacological management can be additional at start of therapy for patient comfortably. for chorionic algorithms of pain treatment is performed with non-pharmacological method.³

the cognitive system analyzing pain causes pain modulations. No opioid pharmacologic therapies and integrative non-pharmacologic multidisciplinary treatments of analgesia are drugs and approaches effective for both acute and chronic pain management. These drugs may enhance life quality of many patients.³²⁻³⁴ Pharmacologic treatments include non opioids like NSAIDs and Adjuvants.³⁵ Figure 1 is an overview of the factors of multidisciplinary pain administration treatment.³

Here figure illustrates the principal treatment elements in multidisciplinary acute and chronic pain management treatment. In children's acute pain, also for pain reduction, multidisciplinary treatment efficacy is investigated with needed opioid doses decreasing to attain comfort. While In children's chronic pain, for measurement of improvements obtained through this treatment, functional improvement is a measured combination of pharmacologic therapy with zonal intervention, unification non-pharmacological method and energize service is useful to the management of pain, pain sings and life quality improvement.³

Multimodality therapy combines more than one method of treatment.³ This method that includes various medicines is optimal for the management of acute pain (Figure 2). Immediate analgesia suffices to permit the improvement from therapeutic treatments/methods with minimal side effects is the primary aim of this method. The treatment approach of multimodal painkiller targets to combine a few opioids of the nociceptive and

neuropathic pain physiology while acute pain management has historically emphasized the use of opioids. Acetaminophen, Nonsteroidal anti-inflammatory drugs (NSAIDs), and glucocorticoids are nociceptive painkillers. Neuropathic analgesics generally include gabapentinoids, lidocaine, ketamine, and alpha 2 agonists. Localized anesthesia and injection of regional anesthetics in a special surgical region are used regularly to allow targeted analgesia. They might assist to decrease the requirement for opioid treatments and these medications are harmless and useful analgesia and sedation.^{3,36-40} For acute pain management in children, presence of a psychologist or child life specialist into the therapy team reduces post-operative pain and anxiety by educating the Pediatric about therapeutic procedures, a plan of pain management, and implementing behavioral pain management interventions (e.g., distraction, play, active relaxation training) in the perioperative period.^{41,42} Another person who manages pediatric pain is an acupuncturist or massage therapist during therapeutic plans and operations.^{43,44} For acute pain in children, utilizing integrative non-pharmacological treatments within multidisciplinary analgesia methods can reduce anxiety about surgery and procedural pain,⁴⁵⁻⁴⁹ and therefore reduce pediatrics' confidence in pharmacological interventions like opioids and benzodiazepines³

In chronic pain management, the methods of pain change from immediate analgesia to widespread pain administration co-operation and Facilitate performance

in areas. So, for chronic pain management, the multidisciplinary method (Figure 2) is a very important standard of care in pediatric pain management.^{50,51} One of the most advantages of multidisciplinary chronic pain management of complex patients is applying integrative non-pharmacological therapies and pharmacological interventions simultaneous Unlike other methods using integrative non-pharmacological treatments only when all pharmaceutical medicine options have been consumed.^{3,52-60}

Disadvantages of opioids like constipation, nausea, and vomiting has minimized their use in chronic pain management.^{13,14} Clinically if opioids are necessary Tramadol or Hydrocodone (weak opioids) can be prescribed in the primary treatment period however in tough pain more potent opioids should be prescribed.³ Treatment and management of pain are necessary for children to care for controlling complications attributed to uncharted pain. Pain evaluation should be periodic. Intensity, place, and source of pain must be determined .appropriate pain evaluation in children is difficult because of low verbalization and understanding of the injury. There is a beneficial evaluation method for each age group. Management of pain such as pharmacological and integrative non-pharmacological therapies has been indicated to be useful in acute and chronic pain treatment. Opioids and opioid-sparing agents as a pharmacological intervention target nociceptive and neuropathic pain physiology specific aspects. With due attention to available research, a combination of pharmacological and integrative non pharmacological treatment is indicated soon in the children's pain management. Future suggestions for pediatric pain management contains efficiency of greater trials in children all over interventions of integrative non-pharmacological pain, evaluation of the synergistic potential of combined integrative non-pharmacological therapies and more study on transferring from acute to chronic pain management.

List of acronyms

CNS. - Central nervous system
EBM- Evidence-based medicine
GIM - Global Index Medicus
IASP- International association for the Study of Pain
NSAIDs - Nonsteroidal anti-inflammatory drugs
WHO - World Health Organization

Author's contributions

All authors played a substantial role in data acquisition and analysis, and also in conception and revision of the manuscript.

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Conflict of Interest

The authors have no conflicts to disclose.

Ethical Publication Statement

We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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