Update in the Treatment of Chronic Pain within Pediatric Patients

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Pediatric chronic pain is a challenging entity to evaluate and treat as it encompasses a wide variety of presentations often with overlapping psychosocial implications. Chronic pain may have significant effects upon a child’s involvement in academic, athletic, and social participation. If unrecognized, it may have deleterious effects upon family interactions and stability. The treatment of pediatric chronic pain is focused on not only providing analgesia, but also on assisting the child and family with reintegrating into a more functional lifestyle. Given the complex multifactorial causes of pain, a comprehensive multidisciplinary treatment plan is often the most effective way to achieve remission. This paper will discuss two examples of pediatric pain that have shown the good response to treatment with a multidisciplinary team approach: complex regional pain syndrome (CRPS) and amplified pain due to Ehlers–Danlos syndrome-hypermobility type (EDS-HT). Treatment of these patients often encompasses a multimodal approach that incorporates physical therapy (PT), occupational therapy (OT), medication(s), pain psychology, procedure(s), sleep hygiene, education, and encouragement of overall physiologic wellness. Management principles are to reduce pain and help prevent future occurrences.

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Introduction

Classically pain has been broken down into two classifications: nociceptive and neuropathic. Nociceptive pain is the result of perceived or true tissue injury and neuropathic pain is a response from damage to the nervous system.1 Newer models of chronic pain eschew this linear physiologic model and instead propose dynamic integrated process in which multiple neural networks interact to process and modulate somatic input as well as stress, emotion, environmental, and social factors.2 Additionally the pain pathways demonstrate plasticity, adapting and changing in response to various stimuli, which is made even more complex in a child with a developing nervous system.3 This biopsychosocial model highlights the complex origin and processing of pain in the nervous system and validates the need for a multimodal approach to treatment to comprehensively address this multidimensional problem.

Initial assessment of pediatric patients with chronic pain will include discussion of the pain symptoms to determine location and type of pain. Somatic pain is commonly characterized as sharp, aching, and stabbing, while visceral pain is often characterized as poorly localized, dull, and cramping. Neuropathic pain is classically reported as burning, shooting, electric pain. No accurate scales exist to quantify pain in pediatrics and pain is often difficult to assess in younger patients, as they may not have the cognitive ability to qualify their experience of pain. When evaluating pain under the biopsychosocial model it is important to gather a comprehensive history including input from the family, caretakers, and teachers when possible to build a broad picture of the child’s physical and psychosocial functioning and identify potential contributors and triggers of pain.1 This article will specifically discuss two types of pediatric pain: complex regional pain syndrome (CRPS) and amplified pain due to Ehlers–Danlos syndrome-hypermobility type (EDS-HT), which fall under the category of amplified musculoskeletal pain syndromes.

Treatment of amplified musculoskeletal pediatric pain includes limiting painful symptoms and optimizing function. Successful management of these patients often encompasses a multimodal approach that incorporates physical therapy (PT), occupational therapy (OT), medication(s), pain psychology, and procedure(s). An aggressive physical and occupational therapy regimen will help to motivate the child to make
improvements in function. Therapists may incorporate various modalities into treatment sessions such as massage or transcutaneous electrical nerve stimulation (TENS)—a noninvasive pain treatment that can be applied during a therapy session. Medication may be used to treat the associated symptoms commonly present in pediatric pain patients such as insomnia and anxiety. Additionally medications may serve as a helpful adjunct to increase and optimize participation with physical and occupational therapy. In addition to exercise therapy, psychotherapy is a critical component of the treatment plan and includes biofeedback and cognitive behavioral therapy (CBT). These techniques are important for teaching, coping, and relaxation strategies, which are beneficial skills for dealing with pain. Involvement of psychologists also provides the opportunity to engage the family in the treatment plan, which can help to prevent the reinforcement of negative behaviors within the family unit. Additionally psychologists may address school performance as there are often associated challenges in the school setting.

Management principles also include promotion of general physiologic wellness through adequate sleep and hydration. Total and complete resolution of pain may not be possible, but function should improve with treatment. This concept should be communicated clearly to patients and families in addition to education about pain triggers and encouragement of a home exercise program to help prevent future exacerbations.

Complex Regional Pain Syndrome (CRPS)

Complex regional pain syndrome (CRPS) is a painful syndrome that has been described as both a neuropathic pain syndrome and an amplified musculoskeletal pain syndrome. CRPS is characterized by continued presence of arm or leg pain out of proportion to the history and physical exam findings. CRPS is divided into two categories. Type I, previously known as reflex sympathetic dystrophy (RSD), is the most common in the pediatric population and occurs in the absence of a definitive nerve lesion, but instead after injury to the soft tissue. Precipitating injury in CRPS type I can range from minor trauma (stubbbed toe and twisted ankle) to major trauma (fracture, dislocation, and gunshot wound). Type II is seen in cases with a specific nerve injury. Pathogenesis is unclear; however it is thought to be multifactorial, affecting the peripheral and central nervous system.

The mean age of pediatric CRPS presentation is 13 years old with young adolescent females being the most commonly presenting patient. It is unusual to see CRPS in children younger than 7 years old. No specific lab test or imaging exists to confirm CRPS, and therefore clinical exam remains the gold standard for the diagnosis of CRPS in children. Diagnosis is made based on the report of persistent pain disproportionate to the history and physical findings and clinical exam features of hyperalgesia and often allodynia. Children will usually present with burning pain in a single limb, most commonly a lower extremity. Autonomic symptoms of temperature change, edema, and hyperhidrosis may be present in affected limb. Imaging and labs remain useful to establish a clinical picture and exclude other harmful processes, for example to rule out fracture, tumor, and dislocation. However imaging, including MRI, plain radiographs, and even triple phase bone scans, has unreliable predictive values for diagnosing CRPS in children.

In pediatrics there is a high rate of comorbid psychological disorders, which may include a commonly observed pattern of dysfunctional familial relationships. Exorbitant stress within the family and child’s life is pervasive. Common presentation is that of an overachieving, compliant adolescent girl exposed to overt conflict and discord in the family. Families of CRPS patients generally exhibit unhealthy relationship dynamics and there is often psychological enmeshment between parent and child. Given the common occurrence of psychological involvement referral for appropriate psychological evaluation and treatment is recommended.

A multidisciplinary approach focused on the reduction of pain and improvement in function is the most effective treatment of pediatric CRPS. Specifically, physical and occupational therapy have proven to be the most efficacious treatment methods. Physical and occupational therapists will emphasize the use of the affected limb through multiple interventions including weight bearing, range of motion, and strengthening. Critical to the treatment of CRPS is the use of desensitization techniques, massage and contrast baths, to reduce amplified pain in the affected limb.

While PT and OT have been shown to be the most effective treatment for CRPS, medication(s) can have
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