Journal of Hand Therapy 31 (2018) 206–214

Contents lists available at ScienceDirect

Journal of Hand Therapy

journal homepage: www.jhandtherapy.org

JHT Read for Credit Article #541.
Scientific/Clinical Article

Evaluation of pain in pediatric upper extremity conditions

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ARTICLE INFO

Article history:
Received 16 December 2017
Received in revised form
9 February 2018
Accepted 9 February 2018

Keywords:
Pain
Children
Upper extremity
Assessment
Evaluation

ABSTRACT

Study Design: Narrative Review.
Introduction: Hand surgeons and therapists play an important role in the early identification of children at risk of developing chronic or recurrent pain after an upper extremity injury. Early identification of children at risk of developing a pain syndrome is critical because their physical, psychological, and/or social functioning may decline quickly without proper management due to the multidimensional nature of pain.
Purpose of the Study: This article outlines one approach to evaluating upper extremity pain in children to help identify those with, or at risk of, chronic pain.
Methods: An assessment framework that recognizes the biological, sensory, emotional, and psychosocial components of pain is described.
Results: The key components of a screening evaluation include obtaining a detailed history and a thorough physical examination that involves: systematic upper extremity mapping of sensory thresholds, mapping of sensory disturbances, and screening of self-reported pain intensity, location, descriptors, and interference.
Discussion and Conclusion: The evaluation approach described will enable hand therapists to identify children with upper extremity pain that are at risk of developing a chronic pain and make an early referral to a multidisciplinary pain team that provides education, pharmacological pain management, physical rehabilitation, and psychological treatments.

Introduction

Children and adolescents may be referred to an outpatient hand clinic because of pain in the upper extremity with or without a clear inciting event or condition. The pain experienced may be acute or chronic pain or a combination of both.[1,2] Chronic pain is defined as persistent or recurrent pain that lasts longer than the expected healing time (arbitrarily defined as more than 3 months).[3,4] The International Association for the Study of Pain (IASP) has further defined chronic pain into seven classifications: primary, cancer, postsurgical and posttraumatic, neuropathic, headache and orofacial, visceral, and musculoskeletal pain.[4] The classifications are self-explanatory, with the exception of chronic primary pain which encompasses pain that persists or recurs for longer than three months, interferes with daily living, and does not fit the other classifications of chronic pain. Chronic primary pain may or may not have biological findings.[4] In the hand therapy practice, screening for primary, postsurgical, and posttraumatic, neuropathic and musculoskeletal pain are most relevant and thus the focus of this article.

Recent studies indicate that the prevalence of chronic or recurrent pain in children and adolescents is common.[5,6] More specifically, a systematic review by King et al[6] found that the prevalence of chronic or recurrent musculoskeletal pain in pediatric populations was 4% to 40%. This wide range in prevalence rates reported may be reflective of the fact that these statistics include point prevalence, weekly, monthly, and 6-monthly prevalence of pain, where point prevalence is lower (eg, 4%).[6]

The authors have no actual or perceived conflicts of interests.

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https://doi.org/10.1016/j.jht.2018.02.004

Monthly self-reported musculoskeletal pain was reported in approximately 40% of children,[6] and weekly pain prevalence was 9%-32%.[6] Lower extremity chronic or recurrent pain was more prevalent in children.[6-8] Given that chronic pain in the upper extremity is less common, it may be overlooked.

Failure to identify pain at its onset, and neglecting to conduct a comprehensive and appropriate evaluation, leads to poor pediatric pain management and treatment.[1] Pain in children can lead to poor physical, social, and adaptive functioning including negative effects on school attendance and performance in daily activities.[9] There is also a strong association between pain and poor mental health in adolescents including anxiety and depression.[5,9,10] As a result, management of pediatric chronic pain is costly, with direct and indirect costs to the health care system as well as lost parental wages.[3] Furthermore, a link between childhood chronic pain and the continuation of pain into adulthood has been identified.[11,12]

Hand surgeons and therapists play an important role in the early identification of children at risk of developing chronic or recurrent pain after an upper extremity injury.[13] The ability to effectively screen upper extremity pain is an important skill set for hand therapists. Therefore, this article outlines one approach to screening upper extremity pain in children to help identify those with, or at risk of, chronic pain.

Pediatric pain: multidimensional

Before starting the screening assessment, to set the stage, it is first important to recognize that pediatric pain is multidimensional.[1] Assessment of pain intensity is important, but it is only one small component of the assessment. Pain includes biological, sensory, emotional, psychological, cognitive, behavioral, spiritual, and sociocultural components.[1,3] In children, this must be considered in the context of development.[1,3] Therefore, the assessment approach for a child with pain should take into consideration the child's psychosocial functioning, coping skills, family dynamics, and peer interactions.[3,14] It is also important to consider how upper extremity pain combined with these factors may negatively affect the child's daily living skills.[3,14] Pain can infiltrate all aspects of the child's life and may manifest as difficulties in eating, sleeping, and participating in school (eg, sitting in classroom, reduced concentration, and attention), physical, and leisure activities.[3,14] The approach to pain evaluation, whether it be a screening or comprehensive evaluation, should recognize the multifaceted nature of pediatric pain.

Pediatric pain: history

The screening evaluation typically begins with a thorough medical history of the onset of pain. The mnemonic PQRST has been recommended to guide the clinician during a pain assessment: P = provokes/precipitating factors, Q = quality of pain, R = region and radiation, S = severity or associated symptoms, T = temporal factors/timing.[15] Identifying the precipitating factor is a good way to begin ruling out whether the pain is nociceptive (pain that arises from actual or threatened damage to nonneural tissue and is due to the activation of nociceptors) resulting from an associated acute or chronic upper extremity injury that requires immediate medical and/or rehabilitation management. At times, there may be a specific inciting event or a nonspecific injury to the upper extremity.[13] If an inciting event is not reported, then a history of the onset and triggers of pain may be helpful to determine if this is a chronic injury. Determine how the child's pain is reproduced or intensified and any specific activities that trigger the pain.

Special attention should be made to evaluate if there is a probable or confirmed nerve injury associated with the precipitating event. This is an important first step to determine if the child has neuropathic pain.[16] The IASP defines neuropathic pain as "pain caused by a lesion or disease of the somatosensory nervous system," with a qualifier that neuropathic pain is not a diagnosis but a clinical description.[17] As such, a grading system (updated in 2016) was developed to determine the presence of neuropathic pain.[16] A possibility of neuropathic pain is considered if the child's "history suggests that pain could be related to a neurological lesion or condition and not other causes such as inflammation or nonneural tissue damage" and that "the pain distribution reported by the patient is consistent with the suspected lesion or disease."[16] In the upper extremity, this would correspond with the territory innervated by injured or affected nerve, most typically distal to the site of the trauma, surgery, or compression.[16] Identifying if the child's injury is associated with a neurological lesion is also useful to differentiate between complex regional pain syndrome in the absence (CRPS I) or presence (CRPS II) of a nerve lesion.[18]

Inquire about any family history (parents, siblings) who may have chronic pain. While history taking, it is important to pay close attention to the family dynamics as greater disturbances in family functioning have been identified in children and adolescents with chronic pain compared to population norms or healthy controls.[19] Poorer family functioning is also associated with higher pain-related disability.[19] Along these lines, ascertaining the family's socioeconomic status (SES) may also provide useful information. Again, in a screening assessment, formal evaluation of SES is not likely feasible due to time constraints. Therefore, data or reported information on or pertaining to occupational position, education, and/or income[20] may provide sufficient insight. There is high-quality evidence that demonstrates that lower SES is a risk factor for onset of musculoskeletal pain in childhood and adolescence.[21] Obtaining the viewpoint of both the child and parent is also important. Carefully note any similarities and differences in their accounts. Variability in the history or nonspecific descriptions of the precipitating event, may be a subtle indicator of an emerging chronic primary or musculoskeletal pain.[13]

A thorough history of the child's medical and rehabilitation management to date also provides important information. It is common for individuals with chronic pain to undergo or seek out multiple medical appointments, consultations, and investigative procedures before they receive an appropriate diagnosis and treatment.[22] Inquire about any previous episodes of pain in the upper extremity, as relapse is a major concern in pain syndromes.[6] Document what types of treatment were offered and followed. This may include pharmacological, physical (eg, ice, heat, physical therapy, massage, orthotics), and psychological (eg, relaxation) treatments. Then, determine if the pain interferes with the child's daily activities including activities of daily living, school, or extracurricular activities. Specifically, has the child discontinued activities due to pain? It is also important to inquire about the child's academic performance, school life (peer interactions), and extracurricular activities (competitive sports) to uncover any potential psychosocial stressors. High academic achievement and participation in competitive sports activities are characteristics associated with children who have chronic pain.[8] Prevalence of recurrent and chronic pain is also higher in girls than boys.[6-8,14]

Physical evaluation

If there was an inciting event that could result in a possible neurological lesion, the next step is to conduct a thorough physical examination to determine whether the pain is neuropathic.[16] Traditionally, "Q = quality of pain" is next in the pain assessment mnemonic, but delaying the physical examination further into the visit may be challenging for children who are young or have limited