The Problem of Pain: Chronic Pain

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Children and adolescents with chronic pain are often encountered in a consultation-liaison (CL) setting during an acute on chronic exacerbation of pain. Families are often experiencing significant emotional distress and may be resistant to discharging without improvement in pain or at least a plan for improving pain. Physicians may feel significant frustration as there is often not an inpatient (or quick) solution for the child's chronic pain and they may struggle with what interventions to provide and when to discharge a child with a chronic pain condition who continues to report significant pain. The CL psychologist can play an important role in the care of these patients with goals to improve patient/family coping strategies and minimize distress, develop plans to limit unnecessary medical admissions and treatments, and facilitate transition to more comprehensive outpatient treatment programs. This chapter provides information germane to CL psychologists encountering inpatients and outpatients with ongoing pain that need initial evaluation and recommendations for further treatment.

Diagnosis

Chronic pain, i.e., in pediatric patients of greater than 3 months duration, is prevalent in children and adolescents with studies indicating 11–38% experience chronic pain (King et al., 2011). Pediatric chronic pain is associated with functional impairment, decreased quality of life (Huguet & Miro, 2008), and psychological comorbidities (Noel, Groenewald, Beals-Erickson, Gebert, & Palermo, 2016; Vinall, Pavlova, Asmundson, Rasic, & Noel, 2016). Estimates indicate about one-third of children and adolescents with chronic pain continue to have pain into adulthood (Brattberg, 2004; Gieteling, Bierma-Zeinstra, Passchier, & Berger, 2008). Inpatient census reports of patients experiencing pain prior to their hospitalization indicate

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up to 20–30% of patients come to the hospital with existing pain (Postier et al., 2018; Walther-Larsen et al., 2017). In addition to substantial individual and family impacts of chronic pediatric pain, the societal impact is significant with an estimated societal cost in the USA of $19.5 billion annually (Groenewald, Essner, Wright, Fesinmeyer, & Palermo, 2014). Epidemiological studies indicate headaches, abdominal pain, and musculoskeletal pain are common chronic pain diagnoses in pediatric patients (King et al., 2011). Children and adolescents may also present with chronic pain associated with an underlying medical diagnosis (e.g., sickle cell disease or juvenile rheumatoid arthritis) or with neuropathic pain (e.g., complex regional pain syndrome (CRPS)). Regardless of the pain etiology, a CL psychologist can be of benefit in helping the patient decrease pain and associated functional limitations, improve pain coping, improve adherence to treatments that reduce pain/improve health, and treat psychological comorbidities.

From a psychological perspective, several diagnoses may be considered when working with patients with chronic pain. Many children and adolescents with chronic pain, particularly those for whom a psychology consult is requested, will meet criteria for a *somatic symptom disorder with predominant pain* (American Psychiatric Association, 2013). It is important to note this diagnosis is equally applicable to a patient whose pain is thought to be predominantly functional in origin as it is to a patient whose pain has a clear medical/organic etiology (see chapter "Somatic Symptom and Related Disorders"). Rather than being reflective of the cause of the pain, this diagnosis indicates a problematic reaction to the pain, including functional impairments, distress, or excessive time focused on symptoms. Given the influential role of psychological factors in pain modulation (see section "Medical Basics" below), it is clear that pain will nearly always be influenced by psychological variables in a patient's life. Thus, the diagnosis of *psychological factors affecting other medical condition* (American Psychiatric Association, 2013) can be indicated in situations where psychosocial factors (e.g., comorbid depression, anxiety, or behavior disorder) are having a significant impact on pain or pain coping, but symptoms associated directly with pain do not meet criteria for a somatic symptom disorder. We have observed clinically that many patients with *conversion disorder* (American Psychiatric Association, 2013) have a pain component to their symptom presentation; however, this would not be a likely diagnosis if pain is the only/primary symptom.

As noted above, many children and adolescents with chronic pain will have comorbid psychiatric diagnoses (Noel et al., 2016; Vinall et al., 2016), such as anxiety and depression, which should also be considered in the psychiatric differential for pediatric patients with chronic pain. It is also possible that the pediatric patient with chronic pain may not have a relevant psychiatric diagnosis, but can still benefit significantly from psychological interventions. In the absence of a clinically significant mental health diagnosis, the primary medical diagnosis may be used with a Health and Behavior code (H&B code) for billing to allow the patient to receive appropriate health psychology services.

Medical Basics: Basic Neurophysiology of Pain Perception and Modulation

In working with chronic pain populations it is essential to understand basic physiological mechanisms involved and to communicate this to the patient and family. Pain sensation originates in peripheral sensory nerves called nociceptors which, when activated by noxious stimulation, send signals to afferent neurons in the dorsal horn of the spinal cord (Price & Bushnell, 2004). Primary afferent neurons transmit signals to a distributed brain network including somatosensory cortices, limbic structures (amygdala), the anterior cingulate cortex, and hypothalamus. Pain sensations trigger brief emotional responses, cognitive appraisals regarding threat, and physiological reactions to the pain.

Psychological processes can act upon this afferent pain pathway to modulate nociceptive transmission and either facilitate or inhibit pain (Price & Bushnell, 2004). Psychological factors known to modulate pain include attention, cognitive variables (e.g., cognitive appraisals, catastrophizing, coping strategies), operant conditioning, psychological conditions (e.g., anxiety, depression), and emotional states (Price & Bushnell, 2004). Impairments in normal endogenous pain modulation (i.e., decreased inhibition or increased facilitation) may create a "pro-nociceptive" state that predisposes development of chronic pain (Yarnitsky, 2010). Central sensitization reflects alterations in central nervous system nociceptive pathways resulting in hyperexcitability of nociceptors, and increased pain, and is frequently observed in persons with chronic pain (Woolf, 2011).

Melzack and Wall's (1965) gate control theory is often utilized to explain pain modulation to patients. This theory proposes a theoretical "gate" at the level of the spinal cord through which pain signals must pass. The gate control theory proposes that various behavioral, psychological, and physiological factors can change how open or closed the gate is, thereby increasing or decreasing the number of pain signals transmitted to the brain. This provides a framework for conceptualizing how psychological interventions can impact pain sensation by maximizing behavioral, cognitive, and environmental factors that inhibit pain (i.e., close the pain gate) and eliminating/minimizing factors that facilitate pain (i.e., open the pain gate).

Psychological Formulation of Pediatric Chronic Pain

A biopsychosocial approach to conceptualization of pediatric chronic pain is typically utilized to account for the impacts of psychological and social variables. Palermo (2012) has proposed a model for conceptualizing pediatric chronic pain that accounts for the biological considerations in pain (e.g., sex, age, physical health), within the context of the individual's psychological factors (e.g., coping, mood, anxiety, beliefs/appraisals), nested within the social environment (e.g., parenting and family factors, peer influences, socioeconomic status, culture), and also considers the role of individual health behaviors (e.g., sleep, physical activity).

In a medical inpatient CL setting, time constraints often require abbreviated evaluations compared to outpatient settings, and thus it is recommended to focus interviews on information necessary to develop a treatment plan for the inpatient setting and for referral for appropriate outpatient treatment. Time permitting, it is helpful to gain an understanding of the history of the chronic pain condition in full (including frequency of emergency room visits or hospitalizations for pain) and factors associated with what is often an acute on chronic exacerbation of pain resulting in the current hospitalization. More complete explanations of biopsychosocial contributions to pediatric chronic pain can be found elsewhere (Law, Noel, Nagel, & Dahlquist, 2017; Palermo, 2012); in this chapter we focus on biopsychosocial variables that are most important for CL psychologists to guide evidence-based interventions in the inpatient setting.

Biological Variables

The CL psychologist should develop a clear understanding of the patient's physical health and pain history, which can be gathered through discussion with consulting physicians, chart review, and interview with the patient and caregivers. Important factors to consider include the pain etiology (e.g., is pain suspected to be primarily functional or organic), how long the pain has been present, the typical course for pain symptoms (e.g., waxing and waning, progressive worsening), triggers for increased or decreased pain, and what kind of medical treatments the patient utilizes and finds helpful. Although not modifiable through therapy interventions, it is important to note some additional biological characteristics that are associated with increased pain including increasing age and pubertal status, female sex, and genetics (Palermo, 2012).

It is also helpful to consider how physiological processes such as central sensitization (Woolf,

2011) and/or a pro-nociceptive (Yarnitsky, 2010) pattern of pain modulation (as discussed in section "Medical Basics" above) might be contributing to the patient's chronic pain. This information facilitates understanding of how psychological interventions can be helpful and often plays a significant role in engaging the patient and family in psychological interventions. Currently, it is not standard of care to complete physiological assessments of pain processing or modulation; however, patient history and/or knowledge about pain processing and modulation in general can inform conceptualization of these processes in an individual patient.

Psychological Variables

Psychological comorbidities such as depression, anxiety, and behavior disorders are common among children and adolescents with chronic pain (occurring in as many as 25%), sometimes beginning prior to the onset of pain (Tegethoff, Belardi, Stalujanis, & Meinlschmidt, 2015). Further, children and adolescents with chronic pain are at greater risk for lifetime occurrence of depression and anxiety when assessed in adulthood (Noel et al., 2016). Depression is associated with greater functional disability in pediatric patients with chronic pain (Kashikar-Zuck, Goldschneider, Powers, Vaught, & Hershey, 2001). These data imply a bidirectional relationship with mental illness having the potential to contribute to development or exacerbation of pain and pain having the potential to contribute to development or exacerbation of mental illness (Palermo, 2012). In healthy individuals, research indicates negative emotions (of low to moderate intensity) facilitate pain (i.e., open the pain gate) and positive emotions inhibit pain (i.e., close the pain gate) (Rhudy, Williams, McCabe, Nguyen, & Rambo, 2005; Williams & Rhudy, 2009). This pattern of modulation may be disrupted in persons with chronic pain, providing further justification for psychological interventions targeting emotional factors.

Thinking styles and cognitive attributions (such as pain catastrophizing, pain-related injustice perceptions, fear of pain, and pain self-efficacy) also impact pain outcomes in children and adolescents with chronic pain. Pain catastrophizing has been demonstrated to have strong associations with quality of life, anxiety, and depression and moderate associations with pain intensity and physical disability (Miller, Meints, & Hirsh, 2018). Children's perceptions of pain-related injustice (i.e., unfairness and blame associated with their pain) are associated with increased pain and poorer functioning (Miller et al., 2018; Miller, Scott, Trost, & Hirsh, 2016). Fear of pain, or the perception of potential pain triggers as threatening, is associated with higher pain intensity and pain-related disability (Fisher, Heathcote, Eccleston, Simons, & Palermo, 2018; Simons, Sieberg, Carpino, Logan, & Berde, 2011). Pain self-efficacy is the belief that one is able to cope with and function effectively despite pain and is associated with lower levels of pain-related disability (Kalapurakkel, Carpino, Lebel, & Simons, 2015). These associations illustrate the importance of assessing how the child/adolescent and their family think about their pain, its impact on their life, and their ability to effectively cope with pain.

Health Habits

Important health habits to consider include sleep and physical activity (Palermo, 2012). Evidence indicates children and adolescents with chronic pain have poor sleep compared to healthy peers, and lower sleep efficiency is predictive of more functional limitations (Valrie, Bromberg, Palermo, & Schanberg, 2013). There is a bidirectional relationship between sleep and pain such that poor sleep is often associated with increased pain the following day, and increased pain is associated with disrupted sleep the following night (Valrie et al., 2013). In addition to baseline sleep disruption, it is important to assess changes in sleep during inpatient hospitalization since children and adolescents often have increased sleep difficulty in the hospital and are at risk for sleep-phase shifting during hospital stays. If sleep is an area of concern, brief interventions can be implemented in the CL setting including sleep hygiene and stimulus control (Palermo, 2012), and referral to sleep medicine specialists and/or for more extensive cognitive behavioral interventions targeting sleep may be indicated.

Physical activity is also important to consider, with high levels of sedentary activity associated with risk for chronic pain in children and adolescents (Auvinen, Tammelin, Taimela, Zitting, & Karppinen, 2008; Paananen et al., 2010) and, in contrast, very high levels of physical activity associated with risk for pain associated with traumatic injuries (Auvinen et al., 2008; El-Metwally, Salminen, Auvinen, Macfarlane, & Mikkelsson, 2007). Further, children and adolescents with chronic pain often have a decline in physical activity during the course of their pain condition, as evidenced by research showing functional impairments in children/adolescents with chronic pain (Huguet & Miro, 2008; Kashikar-Zuck et al., 2001). Obesity is also associated with chronic pain in children and adolescents (Wilson, Samuelson, & Palermo, 2010).

Social Variables

Operant conditioning, particularly negative reinforcement, has been shown to play a significant role in pain behaviors (Sanders, 2002); as such, it is important to assess how family members, peers, and others respond to pain behaviors. Responses to pain that result in a temporary reduction of pain (resting, parental comfort) or avoidance/escape of an unpleasant experience (avoidance of nonpreferred activity such as chores or school) may negatively reinforce, and thus maintain or exacerbate, pain behaviors (Sanders, 2002). Solicitous responding to pain (e.g., attending to pain, allowing activity limitations) by parents is associated with increased pain and pain behaviors (Claar, Simons, & Logan, 2008). High levels of pain catastrophizing among mothers of children/adolescents with pain are associated with greater pain reports. Poorer family functioning (e.g., frequent arguments, poor communication) is associated with increased pain-related disability (Lewandowski, Palermo, Stinson, Handley, & Chambers, 2010). Further, children who have a parent with chronic pain have an increased risk for chronic pain themselves (Hoftun, Romundstad, & Rygg, 2013), which can be hypothesized to be due to both genetics and modeling or other social contributions to pain (Palermo, 2012). To assess these potential impacts on pain it can be helpful to ask about daily routines, functional limitations, how the family decides to limit functioning, impacts on peer relationships, and barriers to managing pain in the home and at school. Recommended self-report assessment measures are presented in Table 1.

Table 1 Suggested self-report assessments for pediatric chronic pain

Domain	Suggested Measures
Pain intensity[a]	Brief Pain Inventory Visual Analog Scale[a] Numeric Rating Scales[a]
Pain location/ widespreadness	SUPERKIDZ Body Map
Physical functioning[a]	PedsQL[a] Oswestry Disability Index Functional Disability Inventory[a] PROMIS Mobility
Emotional functioning[a]	PROMIS Depressive Symptoms PROMIS Anxiety PROMIS Psychological Stress Pain Catastrophizing Scale Children's Depression Inventory[a] Revised Child Anxiety and Depression Scale[a] PedsQL
Role functioning[a]	School attendance PedMIDAS (headache) PedsQL
Symptoms and adverse events[a]	Symptom Severity Index
Global judgment of satisfaction with treatment[a]	Global question with specifiers
Sleep[a]	PROMIS Sleep PROMIS Fatigue Pittsburgh Sleep Questionnaire Sleep Habits Questionnaire
Motivation	Pain Stages of Change

Notes: Clinicians should consider age normative data, as well as how aspects of reliability and validity may be relevant to the clinical context. For some of these measures, child and parent-proxy versions are available. Most of these questionnaires are available in the public domain

[a] Core outcome domain recommended by PedIMMPACT (Pediatric Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials), a professional consensus meeting that identified core outcome domains and measurements that should be considered in clinical trials of treatments for acute and chronic pain in children and adolescents

Engagement in Psychological Treatment

Consistent with CL services more generally, children and adolescents hospitalized with chronic pain typically do not present to the hospital setting in search of psychological care and have varying levels of receptivity to CL psychology services. Therefore, it is important that efforts are made to educate the patient/family to establish "buy-in" for the relevance and benefits of psychological interventions. To do this, psychoeducation about psychological influences on pain is crucial, often involving education about the gate control theory (Melzack & Wall, 1965). Additionally, the use of clinical analogies to describe pain, pain modulation, and treatment can be helpful for increasing patient's understanding and buy-in. Coakley and Schechter (Coakley & Schechter, 2013) provide several examples of useful clinical analogies when working with children with pain. Additionally, it can be helpful to highlight or elaborate on examples the child/teen mentions regarding their own experiences that illustrates the interaction between pain and psychological or behavioral factors.

A developmental approach to the child's pain provides a framework for helping move resistant or hesitant families toward increasing buy-in for psychological interventions. It can be beneficial to first assess the child and family's conceptualization of pain and introduce new concepts or examples to move them toward a more biopsychosocial approach. For example, in some cases a patient/family is resistant to a suspected functional etiology for the patient's pain. While the eventual goal may be to help the family better understand and accept a functional etiology, this may be difficult to achieve during the brief encounter of an inpatient consult, particularly during an acute pain exacerbation. Rather, the goal of an inpatient consult can be to help the patient/family understand that *regardless of the etiology for pain,* psychological factors play a role and psychological interventions can be of help for coping with pain.

Intervention

Substantial evidence to date supports the effectiveness of the use of psychological therapies in treating pediatric chronic pain (Eccleston et al., 2012). The inpatient admission represents a unique opportunity to provide evidence-based intervention to a captive audience in acute pain and distress; however, due to the nature of inpatient CL, time is often limited and effort may be focused on facilitating discharge. Therefore, the clinician should focus on case formulation and specific goals that will facilitate a discharge to successful outpatient intervention. Motivational interviewing techniques may be particularly useful in obtaining engagement in treatment and patients' and parents' willingness to try new behaviors or coping skills (Simons & Basch, 2016). For example, open-ended questions, affirmations, reflections, and summarizing can be used to facilitate an environment in which the patient and family feel comfortable discussing their ambivalence about pain self-management and/or psychological treatment for pain (Rosengren, 2018). Through this discussion patient's personal goals/values and motivations (e.g., desire for less pain, goal to return to social or athletic activities) for pain self-management can be identified, focused on, and facilitated to strengthen motivation to participate in treatment. Parent education regarding differential attention to non-pain behaviors can reduce pain behaviors in the inpatient setting and at home through the transition to outpatient therapy. Similarly, the patient and/or family can be engaged in short-term goal setting to increase functioning to facilitate discharge, such as goals for movement or walking (Palermo, Wilson, Peters, Lewandowski, & Somhegyi, 2009). For some patients, the focus of motivational interviewing can be to develop the willingness to engage in self-management of pain during the next stage of treatment which may include return to school (see below) (Logan, Conroy, Sieberg, & Simons, 2012). Additional pain-coping techniques may be adapted for implementation in an inpatient setting. For instance, creative thinking regarding opportunities for distraction can be useful. Similarly, though extensive biofeedback training may not be feasible, brief training in biofeedback-facilitated relaxation may ameliorate some distress, provide a concrete illustration of the mind-body connection, and provide a positive coping technique to a child in pain and distress (see chapter "Technological Innovations in Pediatric Psychological Consultation") (Table 2).

Pain-focused CBT has ample evidence to support treatment of pediatric chronic pain (Eccleston et al., 2012), but a full course of pain-focused CBT may not be feasible during a brief inpatient stay. Instead, the inpatient CL clinician can provide training on core skills that may be relevant and helpful to an engaged patient, such as identifying and challenging a few key cognitive distortions. Finally, the clinician can help the patient and family problem-solve barriers that would impede adherence to discharge recommendations and transition to outpatient treatment, as well as proactively problem-solve concerns to prevent readmission. Many times this will include re-integration into school after the hospitalization, especially if there was considerable number of days missed prior to the admission, and addressing affective distress over poor attendance and decreased performance in school and when depressive symptoms are present (Logan & Simons, 2010). Educating parents regarding the use of either an Individual Education Plan or 504 Plan to include academic accommodations can help remove some barriers to re-introduction into school. Stressing to parents the need to request an evaluation for either of these educational tools in writing is important. Common requests can include use of a rolling backpack to carry books, extra sets of books for classroom and home use, access to snacks and hydration, extra time for passing periods, use of computer or tablet for note taking, and access to notes from the teacher or trusted peer can all be rather readily included in such plans.

Table 2 Common interventions for children and youth

Education for parents and children

- *Managing Your Child's Chronic Pain*[a,b,c], Tonya Palermo
- *When Your Child Hurts*[a,b], Rachel Coakley
- *Pain Bytes*[a,b,c,d]
- Magination Press book titles regarding pain[a,b,d]
- Coping Club website[a,b,c,d]

Interventions

- Relaxation-based biofeedback[d]
- Cognitive-behavioral therapy[b,c]
- Hynosis[a,b,c]
- Mindfulness Based/Acceptance and Commitment Therapy[b,c]
- WebMap Mobile Application[b,c]
- Children's Health and Illness Recovery Program (CHIRP)[b,c]
- Fibroguide[b,c,d]

[a] Elementary school (6–10 years old)
[b] Middle school (11–14 years old)
[c] High school/early adult (15–20 years old)
[d] For additional information see online resource guide associated with this chapter

CL psychologists in the inpatient hospital setting should anticipate several common barriers to implementation of courses of evidence-based therapies commonly employed in pediatric pain clinics: (1) shortened length of stay (LOS) may prevent complete psychological interventions and treatment, (2) skepticism from patients and families about the necessity of conceptualization of their pain as chronic, and the psychologist's role in that care. The following section will describe relevant strategies to be most efficient and productive when encountering patients with pain on a hospital unit.

While LOS is short, hospital settings often provide access to numerous family and medical caregivers who can provide a wealth of information about the child's pain, which is not always readily available within an ambulatory setting. Participating in inpatient medical rounds; speaking with the patient's nurses, physicians, and ancillary care providers; observing the patient and family while hospitalized; and gathering information directly from the patient and family can provide an efficient multimodal evaluation (PROMIS measures).

Another set of barriers commonly encountered is surprise on the part of the patient that a psychologist is involved in their care. Patients may fear that a psychologist's involvement indicates the treatment team thinks their pain is made up, exaggerated, or, worse yet, "all in their head." This is a considerable barrier that pediatric psychologists on interdisciplinary teams frequently encounter. With practice, one can learn to respond to this with patience, reassurance, empathy, and sometimes well-placed humor. Additionally, when other professionals normalize the inclusion of mental health professionals, with phrasing like "this is how we treat pain here" or "pain is very complex and it requires professionals with many different skills to treat effectively," "the pain psychologist is a specialist who can help your child and our team provide the best possible care," or "dealing with pain can be very challenging and we want to ensure that your child's emotional health is considered when treating their illness," patients and families are more welcoming to the CL psychologist. CL psychologists need to ensure they provide the team with value-added content, e.g., targeted training by psychologists regarding topics like how to use motivational interviewing, how to use screening for depression, and how to talk to families about difficult topics like somatic symptoms or trauma. Additionally, CL psychologists can talk with the patient and family about how the emotional experience of pain is shaped by thoughts and emotions, not caused by them, to help allay fears that their pain is going to be minimized or dismissed by the team as simply fabricated. Finally, educating patients as to the scope and limits of the interventions, which is focused on pain and working toward discharge, can be helpful in reducing defensiveness. For example, topics like parental complex trauma, parental pain, and problematic peer relationships the patient has at school, while important to note, will be unlikely to be resolved while in the hospital, but should be noted in documentation and longer-term treatment plans. Deep and extended inquiries into these issues with the patient and family may overwhelm the patient and diminish rapport while serving no clear immediate purpose. As a consultant, your role is to build rapport with the family, assess their psychological needs, and provide initial interventions flexibly. The goal is generally to increase the likelihood that patients will follow up with psychological care after discharge. This is especially important for highly complex care that will require intense follow-up such as within a pediatric pain clinic or pediatric pain rehabilitation center.

Transition to Outpatient Care

Interdisciplinary collaboration is crucial to the successful outcome of an inpatient admission for pediatric chronic pain. The roles of the inpatient providers may vary based on the goals of the admission; however, they will likely include diagnosis and conceptualization of the presenting concern and developing a comprehensive plan for treatment. Typically, once competing diagnoses are eliminated, the CL psychologist can be instrumental in shifting the conversation with the patient and his or her family in the direction of rehabilitation. The clinician should help the family and the medical team validate the patient's pain while emphasizing the importance of developing a plan for restoring functioning. Specifically, after the evaluation is complete, the CL psychologist can begin preliminary intervention steps to set up the patient for continuing to progress in the outpatient setting. This likely includes educating the medical team and the family about chronic pain, including the biopsychosocial model, and the rationale and expectations for treatment. For instance, we have found inpatient-referred patients who are the most successful in our outpatient treatment programs have a strong foundation in understanding the nature of chronic pain, how function may improve before pain reduction occurs, and that any improvement will be the result of hard work and persistence to accomplish improved functioning. Effective communication, through visual depictions and metaphors, is especially important at this stage. A secondary focus of this preliminary intervention can be a brief introduction to coping techniques, such as developing a plan for a daily schedule at home after discharge, simple relaxation or distraction techniques, and parent management training. Finally, an important role for the CL psychologist will be the referral to an appropriate outpatient treatment program. Pediatric pain-focused treatment programs are constantly emerging and can vary considerably in which services are offered. An annually updated list of recognized programs for the United States and Canada can be found on the IASP Special Interest Group on Pain In Childhood's website.

Presence of clinician expertise and assurance of key environmental factors can facilitate optimal intervention for chronic pain in the inpatient consultation-liaison role. The clinician should be knowledgeable on the biopsychosocial model of pain and developmental factors related to pain presentations (Palermo, Valrie, & Karlson, 2014). Though comfort in flexibly applying psychosocial treatments for pain based on developmental appropriateness is paramount (Palermo, Eccleston, Lewandowski, Williams, & Morley, 2010), some foundational knowledge on medical aspects of painful conditions as well as medical treatments for pain can increase the clinician's conceptualization and communication regarding the intervention (see section entitled "Medical Basics" for details). To facilitate the intervention, ensuring the patient's room is quiet and has restrictions on interruptions by staff and other visitors is crucial to the sensitive discussion regarding concerns of chronic pain and especially essential for particular interventions such as relaxation training and biofeedback. The clinician should ensure parental or caregiver presence as developmentally appropriate, but clearly understand the role of systems theory here, that there may be powerful forces at play to keep the system in its current state, e.g., child and parent's separation anxiety could work to reduce parental insistence of school return. For instance, interventions for younger patients will likely focus on parent education and training, whereas interventions for adolescents may include relaxation and cognitive coping skills that can be taught individually to the patient and then reviewed with the parent for support. Supplementing and reinforcing concepts and skills with handouts and technological equipment (e.g., portable HRV or GSR devices) can be of assistance, particularly when concepts and skills are new to the patient and family, to facilitate engagement with treatment approach and practice of skills in the clinician's absence. For instance, depictions of the biopsychosocial model of pain, notes on relaxation instructions, worksheets on challenging cognitive distortions or meeting goals, or web applications for relaxation can be useful. Finally, informing the medical team of concepts and interventions taught can be helpful so that the medical team can continue to review and reinforce these throughout the patient's inpatient stay.

Outpatient Consultation

This section will address consultation in outpatient specialty and primary care clinics and coordination with outpatient mental health resources. In the case of patients seen initially for consultation in the hospital, this section will address next steps after discharge, e.g., short-term follow-up by the CL team.

Most cases of inpatient medical admission regarding chronic pain among children will require long-term follow-up for generalization and advancement of pain coping skills. Steps after discharge will be based on the particular needs of the patient and should be determined by the CL clinician in collaboration with other treatment providers, such as physicians and physical therapists. If the patient presents significant safety risks, such as suicidal ideation, a general psychiatry admission is likely indicated to stabilize these factors prior to any pain-focused treatment. Alternatively, if there is significant psychiatric comorbidity alongside pain concerns, a medical-psychiatric unit may be advisable. When primary concerns are related to pain, the CL clinician should match the level of services to the child's needs. In cases where disability levels are high, inpatient rehabilitation care may be indicated, available at a growing number of sites in the country. Increasing evidence supports the interdisciplinary intensive rehabilitation occurring within these programs that are designed to improve functioning, increase activity, and foster coping with pain (Hechler et al., 2015; Simons, Sieberg, Pielech, Conroy, & Logan, 2012). Several considerations should be made when considering an inpatient rehabilitation admission versus a less intensive partial or day hospital stay: first, ensuring the family and patient are willing to support this level of care, and, second, consideration of extent of disability, e.g., ambulatory status, missed days of school, and ability to attend to activities of daily living. Lack of adequate progress in less intensive services often helps build the case for more intense care. For moderate levels of disability, the CL clinician may be able to refer to an intensive outpatient program where available. Such programs typically last 2–4 weeks, include interdisciplinary treatment in a day program setting, but require family involvement ensuring adherence to program recommendations outside of treatment hours and have demonstrated effectiveness (Simons et al., 2012). Finally, if disability levels are milder, individual outpatient treatment may be appropriate, in which case the CL psychologist can refer to an outpatient psychologist trained in treating pediatric chronic pain, sometimes available through the tertiary care setting or based in the community. *Any* to *many* of these programs typically involve long waitlists. Therefore, in addition to providing a referral, the CL psychologist can provide short-term follow-up care to facilitate the transition of care, as well as providing consultation and collaboration with the next provider.

Case Example

Sickle cell disease is the most common genetic blood disease among individuals in North America. Though acute, vaso-occlusive pain episodes are one of the sentinel symptoms of sickle cell disease, individuals commonly experience acute on chronic pain, often complicating treatment for this disease (Dampier et al., 2017).

Lu is a 17-year-old male with a diagnosis of sickle cell disease Hgb SS who experienced early complications of painful dactylitis, fevers, and chest pain requiring hospitalizations as a toddler. Currently, he is maintained on hydroxyurea, glutamine, methadone, and morphine, but due to frequent hospitalizations (6–8/year) lasting several days up to 2 weeks' duration, his team has growing concerns about his adherence and treatment efficacy (e.g., escalation of ED visits and hospitalizations, early requests for medication refills of his opioid medications, frequent inconsistencies in his report of medication use, stories of losing his medications, and negative urine screens for medications he was prescribed).

Psychosocial complications navigated by his team included his immigrant parents' status from a predominantly Muslim country of origin, his adherence to fasts during Ramadan which make taking maintenance doses of hydroxyurea difficult, and the death of his father during Lu's early years of life, living with his sister, her husband, and several children, while being away from his mother and brother who live in a large urban area on the west coast of the USA. The distance from his mother and difficult dynamics between him and his sister at times cause a good deal of distress for Lu; e.g., when his sister perceives that Lu is non-adherent to his medications, she calls Lu's mother. Lu then worries that his mother's level of distress will be detrimental to her health and lead to her untimely death, like he experienced with his father.

Results of neuropsychological testing revealed an individual with overall IQ estimated in the mid to upper 70s on brief IQ measures (Kaufman Brief Intelligence Test). Naturally, the treatment team was concerned that he may not understand complex treatment regimens or complex verbal instructions that require extensive conditional problem-solving.

In this particular situation, a psychologist embedded within the Comprehensive Hemoglobinopathies clinic and the consultation-liaison psychologist within the Children's Hospital were a part of a larger team including a hematologist, clinic nurse, Acute Pain Service, Palliative Care staff, Child Life, and a complex care team care coordinator. Both psychologists taught and reinforced skills Lu learned in the Sickle Cell clinic visits and frequent hospitalizations. Relaxation training (diaphragmatic breathing, progressive muscle relaxation), thermal biofeedback-assisted relaxation therapy, Beverly Thorn's Literacy Modified Cognitive Behavioral Therapy manual, the Children's Health and Illness Recovery Program Patient and Family Workbook (CHIRP; Carter, Kronenberger, Scott, & Brady, 2020), and behavioral strategies for medication adherence, e.g., use of pill boxes, schedules, and cell phone alarms placed on his calendar, were all elements of his successful treatment.

Ultimately, Lu was referred to an intensive outpatient pediatric pain clinic where physical therapy, occupational therapy, psychotherapy, art therapy, and recreational therapy were able to work with him over a 3-week session. Upon discharge from the pain clinic, he resumed regular school attendance, was more physically active, and was experiencing less pain. The set-up for the transition from the hospital to the outpatient setting was crucial, and without it, the move to the intensive outpatient clinic would not have been as successful.

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