Special Interest Group on Pain in Childhood
INTERNATIONAL ASSOCIATION FOR THE STUDY OF PAIN

Pediatric Pain Letter
Commentaries on pain in infants, children, and adolescents

October 2019 **Vol. 21 No. 3** **www.childpain.org/ppl**

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Commentary

Pediatric pain, CBT, and the internet: Modern tools for pain management

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Pediatric chronic pain (CP) is a national epidemic, affecting up to 1 in 3 youth (King et al., 2011) and costing the U.S. $19.5 billion annually (Groenwald et al., 2014). Increasingly more youth are presenting to the hospital with CP, with an 831% increase in inpatient admissions between 2004 and 2010 (Coffelt et al., 2013). Pain has historically been viewed as a biomedical problem; as such, it has primarily been treated with biomedical solutions, leading to an increase in youth opioid prescriptions (Martin & Zeltzer, 2018). However, it is well-established that CP is a complex, biopsychosocial condition requiring interventions that target not only underlying tissue pathology and system dysfunction, but also emotional, cognitive, behavioral and social components (Melzack & Wall, 1965; Gatchel & Maddrey, 2004; Gatchel et al., 2007). Cognitive Behavioral Therapy (CBT), which targets these multiple components in concert with interdisciplinary care, has a growing evidence-base indicating utility for reducing pain frequency and intensity, increasing functionality, and targeting comorbid issues such as anxiety, depression, and systemic family issues (for recent review and summary see Eccleston et al., 2015; Coakley & Wihak, 2017).

Because an individual's conceptualization of pain is associated with degree of disability, pain intensity, outcome expectation, and multidisciplinary treatment engagement, pain neuroscience education (PNE) has also emerged as an important component of pain management both for adults and youth (Moseley & Butler, 2015; Louw et al 2017; Pate et al., 2018). The growing body of research on PNE suggests that it can reduce pain-related fear, alter pain perception to make pain less threatening, improve physical performance, increase motivation to engage in physical activity, and, importantly, reduce pain itself (Moseley et al., 2004; Moseley, 2005; Louw et al., 2013). Contemporary treatments for pain, including CBT, therefore often emphasize PNE in addition to cognitive and behavioral strategies (Palermo, 2012; Louw et al., 2016; Robins et al., 2016). This includes explaining pain and how it works in the brain; the interrelationship between cognitions, beliefs, emotions, behaviors, and environmental context; and the biopsychosocial model.

This commentary explores how online resources can be integrated into individual and family psychotherapy approaches for youth with pain. A specific goal is to highlight how these tools can augment the efforts of providers in independent practice or other settings outside of integrated interdisciplinary hospital-based pain treatment programs.

In today's culture, people get much of their information online. In fact, individuals with chronic illness reportedly use online resources to obtain medical information and even manage their conditions (Fox & Duggan, 2013). National surveys suggest that adults seeking health information believe most online information is accurate, and make important health-related decisions based on this information (Fox & Rainie, 2002). Parents searching for health information about their children

appear to be among the top users of online resources (Fox, 2011). One recent report indicates that the internet is the source of health-related information most frequently used by youths themselves (Park & Kwan, 2018). Disturbingly, a study examining health information obtained online by youth showed that the majority of students believed the content of the websites they read was accurate, despite the fact that over half the websites were largely inaccurate; the authors concluded that youth searching for health info online may take away predominantly incorrect information (Kortum et al., 2008).

Because the availability of high-quality health information can have a significant impact on health outcomes (Park & Kwan, 2018), and because the internet is overflowing with fiction and rumor, it's important to direct patients to reputable sources. Indeed, researchers examining the veracity of pediatric health-related info on the internet explicitly call upon healthcare providers to recognize how frequently parents rely on the internet for potentially unreliable information, and to consider offering families websites identified as accurate and trustworthy (Scullard et al., 2010; Chung et al., 2012).

Healthcare providers such as therapists can supplement treatment with web-based resources, bringing in additional expert voices and medical information from reputable sources to support and verify treatment content. This may be especially helpful for solo providers in private practice who are not embedded within a larger team, and don't have the benefit of multiple voices echoing the same message. Because families vary widely in internet use, beliefs about pain, openness to therapy, and readiness for change, practitioners can individualize online recommendations according to need. Families referred by medical providers to non-pharmacological treatments like CBT, for example, may experience some initial confusion and perceived stigma around a therapy referral for a problem believed to be biomedical. These families may benefit from additional support and psychoeducation about pain neuroscience, the biopsychosocial approach to pain management, and evidence for psychosocial interventions before proceeding with treatment.

The following is a case study illustrating the benefits of integrating digital resources into a private CBT practice: M, a 13-year-old female, was referred to CBT for treatment of chronic migraine, nausea and abdominal pain. She'd missed 8 months of school, avoided sport, physical activity, and social activity, and spent most days in her bedroom. During the intake call, M's mother expressed confusion as to why her child had been "sent to therapy for a physical problem" and voiced disbelief that therapy would work. She was open to learning more about CBT for pain, so was offered multiple online resources prior to intake, including Moseley's *Tame the Beast* video (see Table 1) and Zoffness' *What is CBT: Why therapy for pain?* web page (see Table 1). While research has not yet determined whether online pain neuroscience education effectively promotes behavior change or alters pain perception, a 2019 study suggests that Moseley's *Tame the Beast* video contains more comprehensive and accurate pain information than other comparable online videos (Heathcote et al., 2019).

Psychoeducation outlining the biopsychosocial model of pain was also provided to M and her parents during initial sessions, including Wakefield and Jerson's (2017) adaptation of the bio-psychosocial model of adolescent chronic pain. M's parents reported that this information was "immensely helpful," verifying and destigmatizing the use of CBT for pain, and reinforcing the importance of addressing cognitive and emotional factors in addition to physical symptoms.

Internet-based resources can also be used to reinforce concepts and techniques taught in session. For example, M, like many teens, struggled to identify her emotions and make the connection between brain and body. Despite her chronic pain, high family distress, and significant school absences, she reported having no stress. In session, an online APA post on the musculoskeletal, cardiovascular, and neuroendocrine effects of stress on the body (see Table 1) was reviewed. A take-home tracking form helped M attend to triggers and notice bodily responses, and she was eventually able to identify multiple pain triggers (e.g. failing take-home tests, parent arguments), as well as physical signs of stress (e.g. light headedness, nausea). M was

Table 1
Internet-based resources for youth with chronic pain, caregivers and providers

Title	Author	Website	Suggested use
Tame the Beast	Lorimer Moseley & David Moen	www.tamethebeast.org/#tame-the-beast	PNE
What is CBT: Why Therapy for Pain?	Rachel Zoffness	www.zoffness.com/what-is-cbt/	Psychoeducation; CBT
Stress Effects on the Body	American Psychological Association	www.apa.org/helpcenter/stress-body	Mind-body connection
The Brain-Gut Connection	Johns Hopkins Medicine	www.hopkinsmedicine.org/health/healthy_aging/healthy_body/the-brain-gut-connection	Mind-body connection
School Support for Children with Chronic Pain	Boston Children's Hospital, Pain Treatment Center	www.childrenshospital.org/centers-and-services/programs/o-_-z/pain-treatment-center/programs-and-services/school-support-for-children-with-chronic-pain	School recommendations
Parent Resources: School	The ComfortAbility, Boston Children's Hospital	www.thecomfortability.com/pages/school	School recommendations
Getting Kids in Pain to School: Tips from the Trenches	Nancy Darling, Psychology Today	www.psychologytoday.com/us/blog/thinking-about-kids/201512/getting-kids-in-pain-school-tips-the-trenches	School recommendations

offered a user-friendly post from Johns Hopkins Medicine (see Table 1) on the enteric nervous system for homework. Reading this appeared to increase her treatment buy-in as well as her sense of body mastery, particularly over GI symptoms.

Technology may also be used to address other common challenges in CBT and pain management such as treatment compliance. Adolescent CBT homework compliance rates are reportedly as low as 50% (Gaynor et al., 2006). Apps and web-based resources may facilitate improved CBT homework- and treatment-compliance (Tang & Kriendler, 2017). This was true of M, who used web resources to facilitate home-practice of CBT skills. After learning diaphragmatic breathing and guided imagery in session, she used web-based guided audio exercises to practice at home, using a log to monitor changes in stress and pain. She downloaded the *Stop Breathe Think* and *Rain Rain* apps to practice relaxation strategies, self-soothing skills, and mindfulness, and used the *Breathe2Relax* app to gain control over breath and heart rate after learning biofeedback. These web-based materials increased motivation and opportunities to practice skills.

Internet-based resources can also help with the parent-training component of CBT, particularly for a therapist in private practice who may not have additional staff conducting separate parent meetings.

Parents oriented to a biomedical model may benefit from obtaining information from reputable, online biomedical sources to verify and support therapist recommendations. M's parents struggled to help M return to school due to fear of pain spikes, and reported feeling alone in this struggle. They were referred to a UC San Francisco pediatric neurology group for parents of teens with migraine; offered a post on the Boston Children's Hospital website stating that "extensive research and clinical experience indicate that children with chronic pain who attend school regularly do better than those who do not" (see Table 1); and directed to the ComfortAbility parent resources webpage (see Table 1). They also read a *Psychology Today* post by Darling (see Table 1), a parent of a child with chronic pain, on tips for getting children back to school. This gave them much-needed encouragement and tools to support M's return to functioning.

Research suggests that youth and parents increasingly use the internet for health information and education. Depending upon the unique needs of each child and family, pediatric pain providers can steer patients toward reliable online resources, and can use these to supplement and facilitate treatment progress and homework compliance. While not all tools noted in this commentary are necessarily empirically supported or evidence-based, they provide examples that the author has found useful in her own work providing pain-focused CBT to youth and families. Such tools may be especially helpful for other solo practitioners in private practice operating without the benefit of a team to verify and support treatment recommendations. Web-based materials can be used both in-session and as resources for home-practice. In this author's experience, they have been particularly helpful for explaining difficult PNE concepts, building upon learned skills, reinforcing treatment recommend-ations, and providing opportunities to practice pain management strategies both in and outside of the office.

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