

Treating pain in children can teach us about treating pain in adults

June 26, 2018 6.40am EDT



Instructor Sensei Giuseppe of Kids Kicking Cancer Italy, teaching a young cancer patient in Bergamo, Italy, on June 6, 2018. Elimelech Goldberg/Kids Kicking Cancer Italy , CC BY-SA

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The U.S. government declared a national public health emergency in October 2017 to address the opioid addiction crisis. More than six months later, the country is still in the throes of the crisis, with no sight in end.

With the nation's spotlight on addiction to pain medications, the underlying epidemic of chronic or severe pain goes largely ignored. Further, although it's hard to know how people are treating their pain, survey data indicate that a third are on prescription pain medications. Indeed, more than 100 million U.S. adults are living with some form of chronic or severe pain. This is more than the number of people living with diabetes, heart disease or cancer, combined.

Almost half are not getting the pain relief needed from medications, and many pain medications have side effects ranging from constipation, nausea and vomiting to addiction and overdose. Many are seeking alternative approaches to pain management. Some surprising answers may come from a group of kids with cancer.

I'm a neuroscientist who studies the adverse effects of painful experiences in children, and we are finding that kids may be able to change the wiring of pain systems in the brain – without medications.

Pain in childhood cancer



Two girls with cancer, displaying some of the side effects of cancer treatment such as hair loss, exhibit their resilience. Bill Branson/National Cancer Institute

The emotional toll of childhood cancer is so unbearable that it is sometimes easy to overlook that extreme physical pain that children with cancer undergo. The “cure” for childhood cancer includes invasive and sometimes painful treatment procedures, including venipunctures (blood draws), port-starts, spinal taps and bone marrow aspirations, which is a procedure that involves taking a sample with a syringe from the spongy tissue found inside bones. On top of that, chemotherapy can cause painful neuropathy, nausea and diarrhea, in addition to pain caused by the tumor itself.

Although pain is often under-recognized in children, those who treat this population see this pain every day and thus make treating children’s pain a top priority. As a result, novel pain treatments sometimes first emerge to treat kids.

The perception of pain happens in the brain, in regions of the so-called **pain matrix**, including the anterior cingulate cortex, thalamus and insula. These brain regions are involved in a wide range of cognitive and emotion-related processes, and critically, seem to be involved with why pain feels so bad, or what is called the affective aspects of pain. Importantly, regions of the pain matrix continue to develop throughout childhood, making them especially sensitive to repeated pain exposures. So the frequent pain experienced with childhood cancer and cancer-related treatment procedures early in life may be especially harmful to the developing nervous system.

In some of the **research studies** conducted by our group and others, we have found that childhood cancer affects the functioning of the pain matrix. Changes in brain structure and function may contribute to chronic pain and other long-term or “late” effects commonly reported by childhood cancer patients and survivors, such as memory and attentional problems.

Given the potential for negative effects on the developing brain, the media attention about the opioid epidemic, and the fact that in some cases, children are already receiving thousands of pills over the course of their cancer treatment, physicians need alternative non-pharmacological approaches to pain management to address pediatric cancer pain.

New answers to pain?

One such promising approach is **Kids Kicking Cancer**, a nonprofit organization that is now in five different countries and using martial arts techniques to empower children beyond the pain, distress and uncertainty of their disease. The therapy of Kids Kicking Cancer involves a variety of mind-body interventions that are science-based, including mindfulness, meditation, breathing and visualization.

In a recent **study**, colleagues in my research group demonstrated that Kids Kicking Cancer is an effective intervention for reducing pediatric cancer pain, with nearly 90 percent of children reporting a reduction in pain by an average of 40 percent over the course of a one-hour session. Few if any pain medications of any kind have demonstrated such dramatic results.

Now, our lab at Wayne State University is using brain imaging to study how this works. Although the study is still underway, some of our preliminary results suggest that children with cancer are able to use these techniques to take control of their lives and rewire their brain's pain matrix.

These techniques may work by not getting rid of the pain signals coming in to the brain, but rather, by changing how distracting or 'salient' the brain sees them. In other words, these techniques may help to control pain by turning down its volume control - pain is just some of the many signals in the brain and people don't have to pay attention to it. And, importantly, these techniques appear to bypass the opioid receptors in the brain.

We adults may have a lot to learn from these children. One of the most unusual elements of Kids Kicking Cancer is that the children with cancer become the teachers. Indeed, the Kids Kicking Cancer "Heroes Circle" program allows for the children to show adults and other children how to "breathe in the light and blow out the darkness" of stress, anger and pain. Our research group hosted a Kids Kicking Cancer seminar with adults and found that almost 100 percent of participants – 97 percent, to be precise – reported that the seminar had a "profound impact" on their lives.

In this seminar, they learned from children battling cancer that the "Breath Brake" can be used to help them overcome challenging stress. By integrating these techniques into their own lives, they can lower their own stress and anxiety but also help to reduce pain and suffering of the children. Thus, these age-old mind-body techniques – combined with a platform that provides a purpose to look beyond themselves to others for inspiration - may be a powerful underutilized therapeutic tool to help adults suffering from pain, addiction or trauma.

In partnership with the state of Michigan and the Wayne State University methadone clinic, we are now testing whether the Kids Kicking Cancer Heroes Circle **program** can reduce pain among adults addicted to opioids and whether the brain systems underlying pain and addiction can be rewired. The

therapy is simple, and involves **breathing** and guided imagery, such as using visualization to extract pain by “making holes” through the pain.

The first recommendation in the CDC’s **guidelines** for doctors for treating chronic pain was to try non-pharmacological, non-opioid interventions first. So maybe we should look to some of our nation’s young superheroes who are battling cancer for some answers to address the epidemic of pain and addiction.



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