

## Commentary

# Moving from knowledge to action in pediatric pain: a look at the past, present and future

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Today when an infant requires surgery, it is standard practice to administer anesthesia to manage the pain experienced during the procedure. However, it has not always been this way. As recently as 30 years ago it was believed that infants did not feel pain and it was thought that the potential side effects of anesthesia were too dangerous for their small bodies. Instead of proper anesthesia for surgery, infants were administered muscle relaxants leaving them paralyzed but fully conscious (Unruh & McGrath, 2014). At the time, meaningful change in neonatal anesthesia practices was achieved only after a mother's advocacy pushed existing research into the public eye. While neonatal anesthesia has since become a standard of surgical care, today children of all ages continue to experience pain in a variety of circumstances despite the availability of science on how to manage it. Armed with decades of research in pediatric pain, it is now up to scientists, institutions, and clinicians in the field to engage with the public and mobilize the science into clinical changes for children with pain.

In the early 1980's Oxford University scientist Dr. K.J.S. Anand conducted a series of experiments comparing groups of neonates undergoing surgery who received standard care (little to no anesthesia) to those who received full anesthesia. Anand (1987) found that compared to the neonates who were given proper pain control, those who received standard care had an increased stress response, suffered more complications, and had a higher rate of mortality. At around the same time, the story of

Jeffrey Lawson, a premature infant, brought the issue of poorly managed infant pain to light in the United States. Born at just 25 weeks gestation, Jeffrey required surgery during his first days of life to correct a heart defect. In keeping with standard practice at the time, Jeffrey received no pain medication during the surgery and died a few weeks later from shock and organ failure. After finding out that her son had not received proper anesthesia during surgery, Jill Lawson went public with her son's story, and her efforts resulted in a high profile Washington Post article (Rovner, 1986). This media exposure served to further stoke the public discussion about inadequate pain control in children and was a catalyst for the development of the field of pediatric pain research, an area that has grown exponentially since that time (Caes et al., 2016). Previous reviews (McGrath, 2011; Unruh & McGrath, 2014) have illustrated the advancement of the pediatric pain field and have described the landmark events that followed Anand's research and Lawson's story such as the release of pivotal position statements by the American Academy of Pediatrics (1987) and the American Society of Anesthesiology (1987) and the establishment of International Association of the Study of Pain (IASP)'s Special Interest Group on Pain in Childhood in 1990. Contributions to pediatric pain research also boomed; the number of published papers on the topic increased more than twofold from the early to late 1980's (Caes et al., 2016). The field has certainly come a long way, but there is still more to be done.

By the time a healthy child turns five years old, he or she will have received at least 24 needle pokes from routine vaccinations alone. While effective pain management strategies have been developed to reduce vaccination pain (Taddio et al., 2015), studies have shown that fewer than 5% of children receive any type of pain intervention (Taddio et al., 1997). Unfortunately, the problem of procedural pain management extends far beyond vaccinations. A recent paper describing an office-based frenectomy procedure disregarded the importance of pain management stating that, “if done early in infancy no anesthesia is required [for the procedure]” (Kenny-Scherber & Newman, 2016). And shockingly, a majority of pediatric procedural pain studies continue to employ placebos and no treatment control groups in their experimental designs (Bellieni & Johnston, 2016). The climate is similar in the area of pediatric chronic pain. For instance, studies have shown that as many as 20% of Canadian children experience pain on a chronic basis (King et al., 2011) and only a fraction receive the pain care that they need (Peng et al., 2007). Anand and Lawson’s early efforts ignited decades of research highlighting the significance of childhood acute and chronic pain and supporting the use of various treatment strategies. But the problem is that audits of clinical practice show that children are still not benefiting from existing knowledge on best practices in pain care. An important next step in the field is ensuring that the existing evidence on pediatric pain makes it into the hands of parents and clinicians who can use it.

Over the past several years a variety of pediatric pain initiatives have placed a modern spin on Anand’s and Lawson’s collision of science and advocacy. For instance, investigators from around the world have harnessed the power of online media to provide care and disseminate evidence-based information to educate and empower patients and parents. The #ItDoesntHaveToHurt and #KidsCancerPain campaigns have engaged in partnerships with online publishers to share science-based pain management information through blogs, videos and social media images and YouTube videos on the topics of neonatal and infant procedural pain and children’s chronic pain have been created and used to translate research into

actionable strategies for parents and health care providers. Organizations have augmented these knowledge to action efforts by establishing programs and protocols to promote institutional uptake of evidence-based practices in pediatric pain. One such example is the involvement of parents in their child’s procedural and chronic pain management. Historically, the role of parents was not viewed as a key component of acute or chronic pain care. Parents were typically not welcome in the room while their child underwent a painful procedure (Merritt et al., 1990) despite their desire to be present (Boie et al., 1999). Years of research outlining the potential benefits of parental presence in addition to parents’ and children’s persistent efforts, has since changed that practice. Parents are now encouraged to attend their child’s painful procedure to provide support and comfort (Piira et al., 2005). The practice of involving parents in specialized chronic pain care has also been a recent development. Early treatments for chronic pain relied on a one cause/one solution approach (Alexander et al., 1993), however, the establishment of the first pediatric multidisciplinary pain clinic at Boston Children’s Hospital in 1986 drastically changed that perspective. The goal of many multidisciplinary pain programs is to develop multifaceted treatment plans for both children and their families, acknowledging the complex biological, psychosocial and family contributions to pediatric chronic pain. Specialized multidisciplinary pain programs have steadily gained support as the gold standard of pediatric chronic pain care with over 40 active clinics in the USA and 7 in Canada (Finley et al., 2014). On a global scale, IASP’s Special Interest Group on Pain in Childhood recently established ChildKind International, an organization dedicated to promoting change by providing a designation to institutions who demonstrate a commitment to evidence-based pediatric pain prevention, assessment and treatment.

Despite these advances, the pursuit of moving research evidence into practice has not come without challenges. Various organizational, social and professional barriers have been identified that hinder implementation of evidence. For instance, there may be financial disincentives for institutions to change practice, clinicians may hold attitudes

about desired practice, or organizations may lack the knowledge and skill to safely and successfully implement the proposed change (Oxman & Flottorp, 2001). These potential barriers highlight the necessity for creating buy-in from all levels of the system including institutions, clinicians, researchers, and patients alike. Collaboration has been a key component of successful knowledge to action projects, including Anand's and Lawson's efforts, and in other areas such as such as the movement towards medication access for HIV/AIDS (Colvin, 2014) and the establishment of safe injection facilities for drug use (Beletsky et al., 2008). Through the continued development and implementation of collaborative science-backed initiatives, the hope is that parents and clinicians will be armed with the knowledge and power to best manage children's pain.

The revolution to mandate surgical pain control for infants emerged from both scientific discovery and public protest and was an early demonstration of how knowledge can be mobilized into action. While surgical pain management for infants has become a standard of care, children of all ages continue to experience pain in a variety of

circumstances despite the science available on how to best manage it. Current practice does not have to remain this way, but as the past has shown, change will require more than conducting the research. It is our responsibility as researchers in pediatric pain to engage and collaborate with the institutions, clinicians, patients and families we work with to translate scientific discoveries from the lab into changes in clinical care. Families should not be left to do it alone. It is up to us to help push change forward so that all children get the best pain care we know is possible.

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