

Distraction Techniques for Pediatric Pain Management

Grace S. Kao and Emily R. Schwartz

A six-year-old female requires IV insertion. She appears tearful and anxious, clutching to and hiding behind her parents. Her parents, growing anxious, request guidance about strategies for nonpharmacologic pain management.

What Long-Term Issues Are Associated with Uncontrolled Pain?

Pain has come to be recognized as a substantial health problem, with pain treatment and relief noted as a human right by the World Health Organization and International Association for the Study of Pain. For children and adolescents, pain management is especially important, as untreated pain in infancy and childhood has been linked to lower pain thresholds as adolescents and adults. Therefore, it is imperative for healthcare providers to identify effective techniques and strategies to help alleviate pediatric pain. Non-pharmacological methods for pain management, including distraction techniques, have evidenced efficacy in contributing to pain relief, especially for acute medical procedures.

What Is Distraction?

Distraction is an effective pain management strategy and is defined (in the context of pain management) as a non-pharmacological cognitive or behavioral strategy that diverts attention from pain stimuli.

How Does Distraction Work to Reduce Pain?

Pain is modulated by various cognitive constructs, and distraction techniques make use of the brain's natural ability to differentiate attention in order to impact pain perception. Given the brain's restricted ability to process stimuli, engaging patients in

distraction techniques limits their ability to experience painful stimuli. Distraction has been empirically shown to reduce pain perception, while increased attention to pain has been found to be associated with increased pain perception. Anesthesia providers are encouraged to implement the use of non-pharmacologic distraction activities as an effective and safe method, particularly for cases in which sedatives can pose substantial risks to the patient.

When and Where Can Distraction Techniques Be Used for Pain Management?

Distraction techniques have been deemed effective in multiple settings, including laboratory settings, during acute medical procedures, with burn patients, and in the context of chronic pain. Techniques provide pediatric patients and their parents tools for self-managing pain. Further, they help to alleviate not only self-reported pain, but also distress and anxiety, which are often potent contributors to pain exacerbation.

Distraction activities can aid the anesthesiologist when patient cooperation proves challenging and can be used to alleviate procedural distress in pediatric patients, which has been linked to lasting behavioral and emotional maladaptation in children. A systematic review and meta-analysis recently demonstrated that children's self-reported pain and behavioral indicators of distress significantly decreased with the use of distraction techniques during painful procedures.

What Is the Role of a Child Life Specialist When Considering Distraction?

Child life specialists are trained to use age-appropriate and specifically tailored preparation methods based

on the child's chronological and developmental age, anxiety levels, and prior hospital experiences. Their involvement can benefit pediatric patients who typically respond well to instructional coaching through painful experiences.

Pain-related anxiety prior to surgery often predicts poor recovery outcomes and/or development of chronic post-surgical pain. Preoperative distraction techniques to allay anxiety range from humor to breathing to use of video games. Humorous environmental distractions and video glasses have been found to have a similar anxiolytic effect as oral midazolam, underscoring the benefit and cost-effectiveness of distraction technique teaching in the preoperative setting.

In chronic pain management, psychologists work with patients and parents to learn how to apply pain distraction techniques in daily life for purposes of restoring function.

How Do Distraction Techniques Work?

Multiple theories contribute to the understanding of how distraction techniques may affect undesired sensations and perceptions (such as pain). The gate control theory of pain, developed by Melzack and Wall in 1956, postulates that pain travels through various physiological "gates" that modulate pain signal intensity. Pain signals may be modulated as an ascending signal through the spinal cord or as a descending signal via interpretation by the brain. It is thought that when distraction is used for pain management, pain-inhibitory processes are triggered that affect nociceptive transmissions, helping to "close the gate" on pain signaling.

From a cognitive processing standpoint, distraction is thought to be effective because it steers cognitive resources away from painful stimuli. The role of attention in pain perception is key, and several models have been proposed to explain how distraction affects the pain experience. First, the capacity model of attention, proposed by McCaul and Malott (1985), suggests that one must actively attend to a painful stimulus in order for it to incur distress, as attention capacity is limited. Thus, if a distraction activity is able to use enough attention processing resources to lessen focus on the pain stimulus, distress will in turn be lessened. Cognitive-affective and neuropsychological models of attention and pain postulate that pain is "evolutionarily disposed to interrupt

attention" and thus, distraction activities must be intentional, goal-directed tasks that engage "top-down" attentional control in order to be effective. A top-down approach entails a goal-directed process that engages working memory, as opposed to a bottom up approach, which is an unintentional capture of attention by stimuli.

What Are Common Distraction Techniques for Children and Adolescents?

A multitude of techniques and technologies may be used for distraction from pain including:

- Controlled breathing
- Imagery
- Counting backwards
- Coping statements
- Solving problems
- Distraction stimuli
 - Movies and/or television
 - Interactive toys
 - Virtual reality technology
 - Music
- Bubble-blowing
- Short stories

How Are the Different Distraction Techniques Distinguished?

Distraction techniques may be distinguished by level of interaction required and are often categorized as interactive/active versus passive distraction. Generally, active distraction involves a patient's participation and involvement in an activity, whereas passive distraction consists of the patient's observance of a stimulus. Both forms of distraction have been found to be effective for pain management, though several studies have concluded that engagement in active distraction resulted in higher pain thresholds and greater pain tolerance, as compared to passive, especially for younger children.

Active distraction techniques increase tolerability and decrease pain scores and distress for pediatric and adult populations. Audiovisual distractions (tablet devices/movies) are particularly successful in reducing procedural distress in children. In accordance

with the cognitive-affective and neurocognitive models of attention and pain models mentioned above, activities that engage central cognitive processing (e.g., virtual reality video games) improve pain tolerance over and above passive distraction.

Distraction types may also be categorized as cognitive versus behavioral. Cognitive strategies include mind-based strategies to refocus attention such as listening to music, counting, and conversation. Behavioral strategies utilize activities-based techniques, such as focused breathing, interactive toys and games, and virtual reality technology.

How Will You Select the Most Appropriate Distraction Technique?

Selection of distraction techniques should include consideration of developmental level and individual patient preferences and temperament. For example, an interactive video game distraction is more effective if the game has capability to shift toward the ability level of the child. Young children typically respond well to distraction activities that are task-oriented, whereas older children respond better to techniques like controlled breathing and reimagination. A patient's ability to self-select their strategy of choice may also, in and of itself, provide a sense of empowerment and control in the pain management process. Distraction methods should be chosen based on the patient's developmental stage, cognitive capacity, and personal preferences in addition to practicality based on the setting of the procedure.

The use of passive or active music therapy as a distraction technique is one of many nonpharmacological interventions which is highly successful in relieving procedural pain in patients of all ages. In both pediatric and adult populations, the activity of listening to music has been shown to decrease pain and anxiety. In that process, patients gain the ability to cope better with their circumstance and gain a sense of autonomy because the distraction aids them in altering the underlying meaning that they associate with the pain and distress that they are experiencing. Music interventions help children gain a sense of control by providing them comfort and familiarity in an otherwise unfamiliar environment.

What Is the Recommended Implementation of Distraction Techniques for Pain Management for Children and Adolescents?

Before the procedure begins, the distraction method deemed most appropriate for the patient should be thoroughly discussed with the child, preferably while the parents are present. The medical team should provide age-appropriate information regarding the nature of the procedure, what the child can expect to experience, as well as details regarding type of distraction strategy that will be used for the patient's comfort. Within the medical team itself, extensive communication and preparation is vital for a successful outcome. When applicable, the use of topical local anesthetic should be used for the patient's maximal comfort. The medical team should provide constant reassurance and praise of the patient throughout the procedure, preferably led by child life or behavioral health professionals. Should the non-pharmacologic distraction approach not suffice, backup plans should be discussed and prepared by the medical team.

What Barriers Should Be Considered in Implementation of Distraction Techniques for Pain Management?

Other cognitive factors may impact the analgesic effects of distraction. For example, catastrophizing – a set of negative emotional/cognitive processes such as magnification, rumination, and pessimism about pain sensations and feelings of helplessness when in pain – has been found to predict delay in distraction-induced pain relief. In adults, attentional bias towards pain-related information has also been found to dampen analgesic effects of distraction. Similarly, chronic pain history, which has been significantly linked to attentional bias toward painful stimuli and higher pain sensitivity and catastrophizing, may also serve as a barrier for optimal use of distraction techniques. Finally, researchers suggest the affective experience of pain also affects effectiveness of distraction and that activities which generate positive affect may impede pain more effectively than those which produce neutral affect.

Suggested Reading

Adler AC, Schwartz E, Waters JM, Stricker PA. Anesthetizing a child for a large compressive mediastinal mass with distraction techniques and music therapies as the sole agents. *J Clin Anesth.* 2016;35:392–7.

Kennedy RM, Luhmann J, Zempsky WT. Clinical implications of unmanaged needle-insertion pain and distress in children. *Pediatrics.* 2008;122:S130–S133.

Kerimoglu B, Neuman A, Paul J, Stefanov DG, Twersky R. Anesthesia induction using video glasses as a distraction tool for the management of preoperative anxiety in children: anesth. *Analg.* 2013;117:1373–9.

Koller D, Goldman RD. Distraction techniques for children undergoing procedures: a critical review of pediatric research. *J Pediatr Nurs.* 2012;27:652.

Litman RS. Allaying anxiety in children: when a funny thing

happens on the way to the operating room. *Anesthesiology.* 2011;115:4–5.

McCaul KD, Malott JM. Distraction and coping with pain. *Pain.* 1985;23 (3):315.

Ruda MA, Ling QD, Hohmann AG, Peng YB, Tachibana T. Altered nociceptive neuronal circuits after neonatal peripheral inflammation. *Science.* 2000;289:628–31.

Schreiber, KL, et al. Distraction analgesia in chronic pain patients: the impact of catastrophizing. *Anesthesiology.* 2014;121:1292–301.