



National Hospice and Palliative Care Organization
Palliative Care Resource Series

**NONPHARMACOLOGICAL PAIN
MANAGEMENT FOR CHILDREN**

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NONPHARMACOLOGICAL PAIN MANAGEMENT

Nonpharmacological pain management is the management of pain and anxiety without the use of medications. This type of pain management uses specific approaches to modify thinking, perception and focus in order to change ones' pain experience. This paper will introduce common nonpharmacological pain strategies for children; describe the parent as the child's coach; outline the process of implementing a nonpharmacological pain plan; discuss strategies for different aged children and examine special considerations such as chronic pain and developmental disabilities.

COMMON NONPHARMACOLOGICAL PAIN STRATEGIES

The following are examples of nonpharmacological pain strategies for children:

- **Distraction/diversion** (toys with lights or movement, video, computer games, iPad or tablet, choices, focus on dialogue or topic),
- **Comforting touch** (stroking, rubbing, massage, cuddling, holding, rocking)
- **Tactile comfort** (heat, cold, ice, transcutaneous electrical nerve stimulation (TENS), Buzzy)
- **Controlled breathing** (bubbles, blowing, breathing exercises)
- **Relaxation** (progressive muscle relaxation, breathing exercises, music)
- **Psychology** – requiring training (guided imagery, biofeedback, music therapy, cognitive behavioral therapy (CBT), hypnosis)
- **Strategies for babies** – (holding, rocking, 5 S's, sucrose, breastfeeding, non-nutritive sucking)

PARENT AS THE CHILD'S COACH

The clinician's role is to work with the child to develop an effective nonpharmacological pain management program and to teach the child and parent(s) how to employ the program strategies. Parents are the best coaches for their child for a variety of reasons.

- Children naturally want their parent to be with them when they are experiencing pain.
- Thus, it is advantageous to provide the child with a coach in whom the child has trust and who is always available when painful stimuli are present.
- Parents may feel helpless when their child is hurting if they feel unable to help. Coaching parents about what to expect and providing developmentally appropriate ways for them to participate in their child's care can be beneficial both to the child and parents (Krauss, Calligaris et al 2016).
- Children should always have adequate information about their body, their illness or diagnosis and what is about to occur that may result in pain.
- Parents or other primary caregivers should be available to the child.
- Children should have heavy doses of choices, control, laughter and fun to ensure that their basic needs are being addressed.

IMPLEMENTING A NONPHARMACOLOGICAL PAIN MANAGEMENT PLAN

Setting the stage, if there is time to do so, is an important first step.

- If the clinician is teaching nonpharmacological pain strategies, the setting should be age-appropriate and child-friendly in order to minimize anxiety and fear.
- An environment which is peaceful, calming and inviting will encourage the child to come in with curiosity and inquiry but without fear or anxiety.
- Even if the setting is the emergency department or a treatment room where bright lights are necessary, the clinician should bring child centered items and use language which will ensure the child perceives calmness and comfort. Toys, books, games and other kid-friendly materials may help level the playing field for a fearful child. Child friendly items can be stored in a large canvas bag, ready to be called into duty whenever needed. Supplies might include bubbles, a pinwheel, Silly Putty, a squeeze ball, toys with visual components such as lights or moving parts, rattles, whistles and New Year's Eve blowers, puppets, handheld video games, a book with baby/toddler faces and a book with the ABCs.

Distraction techniques which use bubbles, toys, pinwheels, and technology devices can be employed by the child's caregiver, child life specialists, or other staff, without prior training (Cramton & Gruchala 2012; Fein, Zempsky et al 2012; Merritt 2014; Wentz 2013). Attempting to teach more complex non-pharmacological strategies when the child is anxious or when time is not sufficient may result in the child experiencing no benefit from the interventions. In the future, these strategies may be discounted as being likely to fail.

The relationship between the clinician who will be guiding the child and parent/s in learning nonpharmacological techniques is just as important as the environment.

- Strategies are often taught by a psychologist, child life provider, educator or a nurse. If the youngster is trying to determine if the clinician can be trusted, his/her ability to concentrate will be diminished.
- If the clinician is a stranger, scheduling at least one or two sessions to practice strategies prior to using them is recommended. During the first meeting, the child may choose an activity to "break the ice" and to get to know and trust the clinician. Possible activities include playing with a developmentally appropriate toy or activity, singing songs together or doing a craft together. Parents will also benefit from building a sense of trust in the clinician.

Helping the child and parent/guardian develop the right approach to nonpharmacological pain management is a process which is essential to the success of nonpharmacological strategies. The child and parents must believe that the strategies are going to be effective if they are going to be effective.

INDIVIDUALIZED PAIN MANAGEMENT PLAN (IPMP)

Each child in pain should receive the pain management that he/she needs. A recommended strategy for accomplishing this goal is the development of an **Individualized Pain Management Plan (IPMP)**. The IPMP should include both pharmacologic and nonpharmacological methods of pain management and be developed for the unique, individual child with consideration of the child's age, developmental stage, physiologic and psychologic components of pain, past pain experiences and, for children who can express them, personal preferences. The components of a child's IPMP should be written out with copies distributed to the child, parent, physician, nurses, psychologist, child life specialist and others who work regularly with the child. Suggestions for the development of an IPMP unique to specific ages and stages, along with strategies for pain management that have shown evidence for success will follow.

NONPHARMACOLOGICAL PAIN MANAGEMENT FOR INFANTS

Benjamin Franklin's statement, "An ounce of prevention is worth a pound of cure" is very true in reference to managing pain. The pain experience of infants, including newborn babies, is similar to and perhaps more intense than pain experienced by older children and adults. Managing the pain of an infant is difficult because a baby cannot express what she/he is feeling and so we can only guess, based on the baby's behavior.

- First, baby's caregivers must be aware that the baby has the capacity to feel pain. With an increased awareness of the baby's capacity for pain, adult caregivers may be able to prevent some painful stimuli from affecting the baby.
- In addition, assessing the cause and the severity of pain helps caregivers to plan next steps.

Rather than listing strategies that may be offered or used in developing the baby's IPMP, this section will discuss strategies that are known to be comforting to infants and which may be used to comfort a baby who is experiencing pain. Unlike older children, a baby's needs do not require a formal IPMP. That is not to suggest that their pain is less, but rather that they are not yet able to make pain management choices.

Parental holding and strategic positioning may also be a helpful place to start reducing baby's pain or discomfort. Reduced stress for infants may be achieved by placing baby in a position where the baby is comfortable and senses that he/she is secure. For example, baby may sit on Mama's lap in a variety of positions: cradled; facing away from mother; held upright with head balanced on mother's shoulder, etc. In each position, mother can embrace baby firmly but gently, providing a sense of security (Corff, Seidemann 1995) and identifying which position seems to make baby most comfortable.

Other strategies focus on oral routes of comfort such as non-nutritive sucking on a pacifier or sucking a pacifier that has a solution of 24-30% sucrose on the nipple (Lewindon, Harnkness et al 1998; Harrison, Stevens et al 2010; Yilmaz, Caylan, et al 2014). The use of sucrose combined with non-nutritive sucking, skin-to-skin contact, and breastfeeding during minor procedures have been associated with decreased objective measures of pain such as duration of crying and baby's heart rate (Cramton, & Gruchala 2012). Some studies suggest that the most effective method of pain

management for babies is breastfeeding (Reece-Stremtan & Gray 2016; Shah, Herbozo et al 2012; Shah, Aliwalas et al 2006). Non-nutritive sucking, sucrose combined with sucking a pacifier and breastfeeding appear to be effective only in children under 1 year of age (Harrison, Yamada et al 2015).

A few other strategies have been tested for their effect on the pain of infants.

- The Five S's for Soothing a Baby may calm a baby by re-creating the noises, movement and snug environment of the womb (Karp 2015). These strategies are said to help baby calm and achieve sleep. The strategies include swaddle, side or stomach position, "shush" the baby, swing and suck. Although primarily suggested as methods to help baby go to sleep, the Five S's are also used, together or alone, for babies experiencing pain.
- Two other techniques have had variable results during testing. First, the Mimo pillow provides infants with comfort through mediation of a parent's physiological features, such as heartbeat. Clinical tests are reported to show a shorter recovery time after diaper change and shorter drying times for infants (Chen, Oetomo et al 2015).
- Second, mechanical vibration has been evaluated for relief of pain associated with heel sticks in neonates. Results were not conclusive since the technique was used along with sucrose and a pacifier, thus confounding the effect (Baba, McGrath et al 2010).

For infants under the age of one year, much of what constitutes pain management comes from contact with the parent or other trusted caregiver. Developmental stage, maturity and age may be factors in which pain management strategy works best for an infant. Preferred techniques may also vary between caregivers. Pain management for procedures such as a vaccination, blood draw or other events known to induce sudden pain, should be offered not only during the procedure but also immediately following the procedure. Finding the most effective method requires trial and error between each baby and each caregiver who will be present during painful events or times.

NONPHARMACOLOGICAL PAIN MANAGEMENT FOR CHILDREN AND ADOLESCENTS

Pain management for children over the age of one year becomes highly differentiated and must meet the preferences of the unique child. It must be appropriate for the child's age, developmental stage, maturity, prior pain exposure and experience and the type/intensity/frequency of pain the child is currently experiencing. A good place to start is with a comprehensive assessment of the unique child. Nonpharmacological strategies should never be "one size fits all". Individual differences in the child are imperative to consider prior to developing the IPMP for that child (Landler & Tse, 2010). If one strategy is not effective another strategy should be tried.

In addition, nonpharmacological strategies, ideally, should not be attempted for the first time when the child is stressed out or frightened. Practice may never "make perfect" but it certainly does provide a child with competence and confidence in the case of nonpharmacological pain management strategies. Finally, another important tool is an understanding of developmental levels in relationship to pain management.

An overview of age levels and what is known about a child's concept of pain at each level will be offered, followed by specific pain management strategies known to work within that age group. A word of caution: Age is not synonymous with developmental stage. The guidelines should be a launching point but should not bind us to a certain strategy. Guidelines offer a possible place to start. Some children have very individual preferences which do not "fit" into a chart. Let the child guide the process rather than being bound by the suggestions.

TODDLERS

Background/Description of Age Group

Language and verbal skills are limited during the toddler period and are very inconsistent from child to child. Most toddlers will not be able to use words to tell us about their pain. Rather, the toddler's pain-related behaviors may inform us through their facial expression, crying, body movements, holding or touching a certain body part or extension of arms or legs.

- According to O'Rourke (2004) these behaviors provide more objective and reliable measures of pain than any verbal reports that we may be able to try.
- Early research by Beyer & Wells (1989) provided insight into the communication of toddlers regarding pain experiences. A two-year-old can, usually, report the location of the pain and tell how it happened. However, they do not yet possess the cognitive skills to describe the severity of the pain. By three years of age, most children can describe the severity of the pain through the use of a three-level pain scale (no pain, a little pain, a lot of pain). Usually, children in this age group can engage in conversations and talk about whether or not they feel pain and "how bad it is".

In addition to the toddlers' emerging self-assessment of their pain, the reports of caregivers can be invaluable in assessing pain in this age group. Fear may impact the toddlers' pain experience as well as their expression of pain and reports of pain. However, caregivers may have difficulty assessing a toddler's pain.

- Crying, screaming or other behaviors associated with fear may be interpreted as pain by parents and health care providers.
- Toddlers may have a developing capacity to report their pain or they may use only one word such as "owie" or "boo-boo" to describe their pain.
- Some children may become very quiet and inactive while in pain or their activity level may increase and be associated with whining and/or aggressive behavior.
- A parent's report that "my child isn't acting like he normally does" may tell us a lot or very little due to factors such as separation anxiety, memory of previous painful experiences or physical restraint (Rivera, 1991).
- Fear and anxiety can affect or intensify a child's pain experience and how the child experiences and assimilates the painful situation (Cramton, & Gruchala 2012). Therefore, it can be emotionally beneficial to address fear and anxiety by nonpharmacological methods such as distraction.

Pain management can be used in the clinic, hospital, home or any setting where the child experiences pain.

- Pain comes in a variety of shapes and sizes including that which is associated with the child's diagnosis (sickle cell, arthritis, etc.) or from an injury or trauma (burns, dog bites, fractures, skin grafts in plastic surgery, etc.).
- Pain management may prove challenging in children with recurrent pain such as abdominal pain or headaches.
- The medical provider may induce pain during procedures like injections, circumcisions, IV starts, etc.
- Nonpharmacological pain management strategies can be used in any location and for any type of pain. Once the child's IPMP is developed, any necessary materials can be put into a small bag to travel with the child and parent and be ready for use.

Some resources recommend positive reinforcement, or praising the child for being brave during a procedure, surgery or while healing from an illness or rewards like games, toys, etc. for the same purpose. This seems to be a dangerous message, however, as it suggests that the child has control over being "good" or behaving in the face of pain. If the child is unable to "be brave" or "good" and shows an expression of pain, the child is likely to feel that he/she has failed and now may feel even more out of control. Showing love, empathy and support are more likely to help the child cope with a situation over which he/she has no control.

Strategies for Toddlers

A rule of thumb with toddlers is "keep it simple". Always speak to the child's primary health care provider before using any pain management strategy. The following strategies are known to be effective with toddlers:

- Parent/caregiver presence (whenever possible)
- Distraction – used during procedures (venipuncture, dressing change, etc.) and as needed
 - ◆ Toys that move have lights or sound
 - ◆ Puppets
 - ◆ Videos (determine which ones they prefer)
 - ◆ Reading, playing a game
 - ◆ Controlled breathing
 - Blowing bubbles, pinwheel
 - Blowing away the pain
 - ◆ Tactile – used before, during, after pain is induced and as needed
 - Buzzy (<https://buzzyhelps.com/>)
 - Cold
 - Heat
 - Touch or massage
 - Cuddling
 - Holding, Rocking
 - Choices ("Would you like ice on your owie or do you want me to gently rub it?")

PRESCHOOLERS

Background/Description of Age Group

Pain assessment begins to become more reliable as children grow and develop. For example, most four-year-old children are able to use pain discrimination scales which have 4 or 5 categories of pain (Goodenough, Addicoat et al 1997). By around 5 years of age, children begin to realize the significance of the pain experience as they are able to rate the intensity of pain (St. Laurent-Gagnon, Bernard-Bonnin 1999).

- Preschoolers love to learn. Teaching them about their body and their pain is an essential part of nonpharmacological pain management.
- They also benefit from explanations about what is happening during procedures or why they are experiencing chronic pain.
- A benefit of nonpharmacological pain management strategies is that discussing the pain and creating an IPMP increases the child's awareness of their pain as they learn to develop methods to gain ownership of their pain and, thus, increase gain control of the pain.
- Functional MRI studies show the midbrain and higher cortical areas of the brain, known to modulate pain, are activated when distraction is introduced (Valet, Sprenger et al 2014; Tracey, Ploghaus et al, 2002).
- Since verbal reasoning or reassurance is not typically understood by children less than 5–7 years of age it follows that distraction techniques are likely to be more effective with preschoolers than are other strategies of pain control. (Krauss, Calligaris et al 2016).

Strategies for Preschoolers

- Physical proximity of parent/caregiver (whenever possible)
- Distraction
 - ◆ Recalling lists (all of your teddy bears, favorite toy cars, kids in your class at school/dance class/soccer team, etc.
 - ◆ Manipulating squeeze ball
 - ◆ Counting, reciting ABCs
 - ◆ Video games
- Relaxations
 - ◆ Breathing exercises (after practice)
 - ◆ Muscle relaxation (turning your arm, body into a bowl of gelatin")
- Guided Imagery
 - ◆ Beginning strategies – picturing lying in their bed at home.

SCHOOL-AGE CHILDREN

Background and Description of Age Group

By the time a child reaches school age, she/he can report pain more accurately and by 8 years of age can describe the location reliably. At this age, psychological factors should also be considered as there may be a correlation with physical pain.

- School absence or recurrent headache or stomachache without physiologic cause may indicate that there are psychological issues resulting in physical symptoms (Gerik 2005).
- School-age children can become engaged in a favorite activity or game and not show behavioral indications of pain and can show self-control when they are in pain.
- For some children, cultural or familial norms may suggest that pain should be minimized or the child may refuse to disclose pain in an attempt to deny pain (Rivera 1991).
- When engaged in distraction techniques, children between the ages of 7 and 12 years showed a statistically significant reduction in pain compared to controls during venipuncture (Karakaya and Gozen, 2016).
- Breathing exercises and progressive muscle relaxation are effective strategies at this stage of development. Practice helps make each of these strategies become effective options for pain management. School-age children often like to teach these strategies to parents, siblings and others. One patient took the strategies back to school where the teacher used them when students became a little too active.
- Guided imagery is effective with some school-aged children at all ages, depending on their developmental stage. Children with active imaginations may not only be able to visualize being in a favorite location, but also smell the smells, hear the sounds and feel a warm breeze.
- By later in the school-age period, children may have success in using hypnosis to train the unconscious mind to promote pain relief (Gerik 2005). Hypnosis is provided by individuals trained specifically in the practice.

Strategies for School-age Children

School-age children may benefit from any of the nonpharmacological pain management strategies. The task is to determine which strategies work best for each specific child. Consider all previously mentioned strategies for toddlers and preschoolers in addition to:

- Distraction
 - ◆ All strategies recommended for toddlers and preschoolers
 - ◆ Recalling lists (name everyone in your class, row by row, etc.)
 - ◆ Video games (become a key tool in distraction)
 - ◆ iPad or Tablet
- Relaxation
 - ◆ Breathing exercises can become a cornerstone of relaxation
 - ◆ Progressive muscle relaxation
- Guided imagery
- Hypnosis
- Biofeedback
- Cognitive Behavior Therapy

ADOLESCENTS

Background and Description of Age

Adolescents are approaching an ability to characterize and accurately describe their pain, its intensity and location because they know the words and concepts to discuss their pain. However, there is a strong psychologic component which may be important to teens (Gerik, 2005).

- It is common for adolescents to want to control their response to pain, especially in front of friends, and this need to maintain control may trump attempts to ensure adequate pain management.
- They want privacy and choice and may or may not want parents to be present (Srouji, Ratnapalan et al., 2010).
- In addition, adolescents crave privacy and do not want adults to know what they are thinking or feeling. As a result, it is important for clinicians to gain the trust of teens in order to understand and provide help in managing their pain. If a clinician fails to give the teen choice (i.e. regarding parents' presence) or ask about a preference in morning rounds with others present, the adolescent may refuse to work with that individual (Gerik, 2005).
- Adolescents do not just want – they expect – developmentally appropriate information about procedures, what they may anticipate and how it will feel.
- It is not unusual to observe regression in the behavior of adolescents under stress (Hagan, Coleman et al, 2001). It is difficult for teens to be told what will, and will not, work to alleviate their pain. Rather, they need to be able to refuse or request certain medications and strategies in order to make procedures or other pain invoking events more tolerable (Srouji, Ratnapalan et al., 2010).

Strategies for Adolescents

Adolescents may benefit from strategies from all previous categories – even from the toddler list – if they will admit it. Adolescents who have experienced regression may appreciate having parents nearby and having Mom rub their back or feet. Rituals, important to toddlers and preschoolers, may resume importance in normal adolescence when illness has removed all predictability and the familiarity of rituals is comforting. Trust cannot be overemphasized. Clinicians must gain the trust of adolescents in order to be able to help them with pain management.

- Distraction
 - ◆ Music (headphones)
 - ◆ Videos – YouTube, online
- Writing
 - ◆ Journaling
 - ◆ Blogging
 - ◆ Pain journals
- Guided imagery – may be very successful when teens buy-in to this strategy
- Biofeedback
- Cognitive Behavioral Therapy (CBT) – allows ownership of pain control
- Hypnosis – See Guided imagery. Also, successful with self-hypnosis.
- Engaging with/teaching strategies for younger children – can only occur after mastering the strategies themselves.

SPECIAL CONSIDERATIONS: CHRONIC PAIN

Chronic pain in children is expressed in ways that are unique and different from the pain expressed by children with new onset pain (Fein, Zempsky et al, 2012; Krauss BS, Calligaris et al, 2016). The five-year survival rate for childhood cancer now exceeds 80% resulting in a large group of long term survivors whose needs are just becoming known (Jemal, Siegel et al, 2008). These survivors have experienced invasive procedures such as bone marrow aspiration, lumbar punctures and more. Furthermore, there is not yet evidence of the impact on untreated pain when many of these young people went through treatment. Thus, procedural pain, anxiety and distress may have caused a significant burden on many cancer survivors treated in childhood.

Former pediatric cancer patients and their parents have identified procedure-related pain as one of the most difficult and distressing parts of having cancer (Zernikow, Meyerhoff et al, 2005). Pai & Kazak (2006) identified that procedure-related distress exists for years after treatment has ended and Doellman (2003) found the same extended duration of anxiety and distress. More recently, 31% to 84% of children and adolescents with cancer report using some form of complementary and alternative medical (CAM) therapies (Sencer and Kelly, 2007) and that they have found effectiveness in relieving procedure-related pain, anxiety and distress (Evans, Tsao, et al, 2008).

SPECIAL CONSIDERATIONS: DEVELOPMENTAL DISABILITIES

Another population with unique needs is children with developmental disabilities who may experience pain in a more intense or heightened manner. Some children in this group do not have communication skills that enable them to express pain or anxiety in a way that is readily understood (Fein, Zempsky et al, 2012; Krauss BS, Calligaris et al, 2016). Parents and caregivers provide the only link to identifying the youngster's pain.

Children who are on multiple medications (i.e. Benzodiazepines) may be at risk of sleep apnea. Special care must be taken with children who are on multiple medications (particularly benzodiazepines) or are at risk of respiratory insufficiency (e.g. sleep apnea). Those with hepatic or renal disease may have impaired metabolism or clearance of opioids and their metabolites. Patients with renal disease may be more sensitive to adverse effects from NSAIDs. Consultation with dosing guidelines or a pain specialist should be considered for such children. (Fein, Zempsky et al, 2012; Krauss BS, Calligaris et al, 2016).

CONCLUSIONS

Pain presents in a variety of settings and in ways unique to each child. A child's age, developmental stage, source of pain, previous pain experience and maturity all may affect the pain experience. Assessing a child's pain is difficult and requires consideration of all of the aforementioned variables. As a result, pain management is unique to each individual child who is experiencing pain. One size does not fit all and pain management strategies for a child may need to be revised often.

The various pain management strategies may be used across developmental stages as desired by the child with pain. Infants, toddlers, preschoolers, school-age children and adolescents may utilize unique ways to control their pain or may use some of the same pain management methods. The development of an Individualized Pain Management Program, or IPMP, will enable each child to incorporate strategies uniquely suited to him/her.

Although children can learn many of the strategies to control pain, a coach to help with some strategies is recommended. An ideal method is to have the clinician coach the pediatric patient and parent in learning pain management strategies. The goal is for the parent to become the child's primary pain management coach. The parent will play a graduated role moving the child from complete responsibility with the infant, to minimal input with adolescents. This partnership between parent and child mirrors the child's growing independence while allowing parents to have a meaningful role in caring for their child when she/he is experiencing pain.

REFERENCES

1. American Academy of Pediatrics Committee on Fetus and Newborn, Section of Surgery and Section of Anesthesiology and Pain Medicine (2006). Prevention and management of pain in the neonate: an update. *Pediatrics*; 118:2231–2241.
2. American Academy of Pediatrics Taskforce. Committee on Psychosocial Aspects of Child and Family Health, Task Force on Pain in Infants, Children, and Adolescents. (2001). The assessment and management of acute pain in infants, children and adolescents. *Pediatrics*;108(3):793-797.
3. Baba LR, McGrath JM, Liu J. (2010). The efficacy of mechanical vibration analgesia for relief of heel stick pain in neonates: a novel approach. *J Perinat Neonatal Nurs*;24(3):274-83.
4. Bawa M, Mahajan JK, Aggerwal N, Sundaram J, Rao KL. (2015). Barriers to pediatric pain management in children undergoing surgery: a survey of health care providers. *J Pain Palliat Care Pharmacother*;29(4):353-8.
5. Beyer JE and Wells N. (1989). The assessment of pain in children. *Pediatric Clinics of North America*.36;4:837–854.
6. Bringuler S, Pico M-C, Dadure C, Rocette A, Raux O, Boulhais M and Capdevila X. (2009). A prospective comparison of post-surgical behavioral pain scales in preschoolers highlighting the risk of false evaluations. *Pain*.145;(1-2):60-68.
7. Chen W, Oetomo SB, Tetteroo D, Versteegh F, Mamagkaki T, Pereira MS, Janssen L, van Meurs A. (2015). Mimo pillow--an intelligent cushion designed with maternal heart beat vibrations for comforting newborn infants. *EEE J Biomed Health Inform*; 19(3):979-85.
8. Chiaretti A, Pierrri F, Valentini I, Russo I, Gargiullo L & Riccardi R. (2013). Current practice and recent advances in pediatric pain management. *Eur Rev Med Pharmacol Sci*. 17(Suppl 1):112–126.
9. Corff KE, Seideman R, Venkataraman PS, Lutes L, Yates B. (1995). Facilitated tucking: a non-pharmacologic comfort measure for pain in preterm neonates. *J Obstet Gynecol Neonatal Nurs*.; 24(2):143-7.
10. Cramton RE, Gruchala NE. (2012). Managing procedural pain in pediatric patients. *Curr Opin Pediatr*; 24:530–538.
11. Doellman D. (2003). Pharmacological versus nonpharmacological techniques in reducing venipuncture psychological trauma in pediatric patients. *Journal of Infusion Nursing*; 26:103–109.

12. Evans S, Tsao JC, Zeltzer LK. (2008). Complementary and alternative medicine for acute procedural pain in children. *Altern Ther Health Med*;14(5):52-6.
13. Fein A, Zempsky WT, Cravero JP. (2012). Relief of pain and anxiety in pediatric patients in emergency medical systems. *Pediatrics*; 130:e1391–e1405.
14. Gerik SM (2005). Pain management in children: developmental considerations and mind-body therapies. *Southern Medical Journal*; 98(3):295-302,
15. Goodenough JB, Addicoat L, and Champion GD (1997). Pain in 4–6 year old children receiving muscular injections: a comparison of the faces pain scale with other self-report and behavioural measures. *The Clinical Journal of Pain*. 13,60–73.
16. Hagan JF, Coleman WL, Foy JM, Goldson E, Navarro A, Tanner JL, Tolmas HC, Armstrong FD, DeMaso DR, Longstaffe S, Gilbertson P, Cohen GJ, Smith K; Committee on Psychosocial Aspects of Child and Family Health. Task Force on Pain in Infants, Children, and Adolescents. (2001). The assessment and management of acute pain in infants, children, and adolescents. *Pediatrics*;108(3):793-7.
17. Harrison D, Stevens B, Bueno M, Yamada J, Adams-Webber T, Beyene J, Ohlsson A. (2010). Efficacy of sweet solutions for analgesia in infants between 1 and 12 months of age: a systematic review. *Arch Dis Child*;95(6):406-13.
18. Harrison D, Yamada J, Adams-Webber T, Ohlsson A, Beyene J, Stevens B. (2015). Sweet tasting solutions for reduction of needle-related procedural pain in children aged one to 16 years. *Cochrane Database Syst Rev*.5;(5):CD008408.
19. International Association for the Study of Pain. Subcommittee on taxonomy. (1979). Pain terms: a list with definitions and notes on usage. *Pain*;6:249–52.
20. Jemal A, Siegel R, Ward E, Hao Y, Xu J, Murray T, Thun MJ (2008). Cancer statistics, 2008. *CA A Cancer Journal for Clinicians*; 58:71–96
21. Karakaya A, Gozen D. (2016). The effect of distraction on pain level felt by school-age children during venipuncture procedure-randomized controlled trial. *Pain Manag Nurs*; 17:47–53.
22. Karp, H. (2015). *The Happiest Baby on the Block*. Bantam Books, NY, NY.
23. Kennedy RM, Luhmann J, Zempsky WT. (2008). Clinical implications of unmanaged needle-insertion pain and distress in children. *Pediatrics*; 122(Suppl 3):S130–S133.
24. Krauss BS, Calligaris L, Green SM, Barbi E. (2016). Current concepts in management of pain in children in the emergency department. *Lancet*; 387:83–92.
25. Lewindon P, Harkness L and Lewindon N (1998). Randomised controlled trial of sucrose by mouth for the relief of infant crying after immunization. *Arch Dis Child*;78(5):453-456.
26. Lonnqvist PA, Morton NS. (2005). Postoperative analgesia in infants and children. *Br J Anaesth*; 95:59–68.
27. Mathew PJ and Mathew JL (2003). Assessment and management of pain in infants. *Postgrad Med J*;79:438-44.
28. McGrath PJ. (2011). Science is not enough: the modern history of pediatric pain. *Pain*;152:2457–2459.
29. Merritt C. (2014). Fear and loathing in the ER: managing procedural pain and anxiety in the Pediatric Emergency Department. *RI Med J*; 97:31–34.
30. Mitchell A, Boss BJ. (2002). Adverse effects of pain on the nervous systems of newborns and young children: a review of the literature. *J Neurosci Nurs*; 34:228–236.
31. O'Rourke D (2004). The measurement of pain in infants, children, and adolescents: from policy to practice. *Physical Therapy*. 84; 6:560–570.

32. Owens M., Todt E. (1984) Pain in infancy: neonatal reaction to a heel lance, *Pain*, 20 (1), 77–86.
33. Pai AL, Kazak AE. (2006). Pediatric medical traumatic stress in pediatric oncology: Family system interventions. *Current Opinion in Pediatrics*; 18:558–562.
34. Phillips DM (2000). JCAHO pain management standards are unveiled. *Joint Commission on Accreditation of Healthcare Organizations JAMA*.;284(4):428-9.
35. Reece-Stremtan S & Gray L. (2016). ABM Clinical Protocol #23: Nonpharmacological Management of Procedure-Related Pain in the Breastfeeding Infant, Revised 2016. *Breastfeed Med*. 2016 Sep 13. [Epub ahead of print]
36. Rivera, WB. (1991). Practical points in the management of postoperative pediatric pain. *J Post Anesth Nurs*;6:40 – 42.
37. Ruest S & Anderson A (2016). Management of acute pediatric pain in the emergency department. *Curr Opin Pediatr*. 28:298-304.
38. Sencer SF, Kelly KM. (2007). Complementary and alternative therapies in pediatric oncology. *Pediatric Clinics of North America*; 54(6):1043–1060.
39. Shah PS, Aliwalas LI, Shah V. (2006). Breastfeeding or breast milk for procedural pain in neonates. *Cochrane Database Syst Rev*. 19;(3):CD004950.
40. Shah PS, Herbozo C, Aliwalas LL, Shah VS. (2012). Breastfeeding or breast milk for procedural pain in neonates. *Cochrane Database Syst Rev*. 12;12:CD004950.
41. Sidhu J & Tickner N (2016). An audit of the management of acute pain in children. *Arch Dis Child*;101(9):e2.
42. Srouji R, Ratnapalan S, Schneeweiss S (2010). Pain in children: assessment and nonpharmacological management. *Int J Pediatr*, pii 474838.
43. St-Laurent-Gagnon T, Bernard-Bonnin AC, and Villeneuve E. (1999). Pain evaluation in pre-school children and their parents," *Acta Paediatrica*. 88;4:422–427.
44. Tracey I, Ploghaus A, Gati J, Clare S, Smith S, Menon RS, Matthews PM. (2002). Imaging attentional modulation of pain in the periaqueductal gray in humans. *J Neurosci*; 22:2748–2752.
45. Valet M, Sprenger T, Boecker H, Willloch F, Rummery E, Conrad B, Erhard P, Tolle TR (2004). Distraction modulates connectivity of the cingulo-frontal cortex and the midbrain during pain: an fMRI analysis. *Pain*; 109:399–408.
46. Verghese ST, Hannallah RS. (2010). Acute pain management in children. *J Pain Res*; 3:105–123.
47. Voepel-Lewis T (2011). The ongoing quandaries of behavioral pain assessment in children with neurocognitive impairment. *Dev Med & Child Neurol*.53:101-107.
48. Weisman SJ, Bernstein B, Schechter NL. (1998). Consequences of inadequate analgesia during painful procedures in children. *Arch Pediatr Adolesc Med*; 152:147–149.
49. Wente SJ. (2013). Nonpharmacologic pediatric pain management in emergency departments: a systematic review of the literature. *J Emerg Nurs*;39:140–150.
50. Wong C, Lau E, Palozzi L & Campbell, F (2012). Pain management in children: Part 1 — Pain assessment tools and a brief review of nonpharmacological and pharmacological treatment options. *Can Pharm J (Ott)*; 145(5): 222–225.
51. Yilmaz G, Caylan N, Oguz M, Karacan CD. (2014). Oral sucrose administration to reduce pain response during immunization in 16-19-month infants: a randomized, placebo-controlled trial. *Eur J Pediatr*.;173(11):1527-32.
52. Zernikow B, Meyerhoff U, Michel E, Wiesel T, Hasan C, Janssen G, Kuhn N, Kontny U, Fengler R, Görtitz I, Andler W. (2005). Pain in pediatric oncology--children's and parents' perspectives. *Eur J Pain*;9(4):395-406.

APPENDIX I

Individualized Pain Management Programs (IPMP)

Jessie is a 10-year-old with Hodgkin's lymphoma. She has had 2 recurrences and is on her third round of treatment. Her strategies of choice have changed a few times throughout the course of treatment. She now carries her IPMP with her, wherever she goes. Her school teacher helps with #5 and 6 on her IPMP, providing interventions at school when needed. Jessie can tell you what IPMP stands for and proudly tells new hospital staff or school personnel that she has an IPMP and what that means.

Jessie's IPMP

| Jessie's Individualized Pain Management Program | Interventions | Materials/Supplies |
|---|--------------------|---|
| 1. Bone marrow aspirates | Conscious sedation | N/A |
| 2. Lumbar puncture | Conscious sedation | N/A |
| 3. Venipuncture | Distraction | Buzzy, water toy, ABC book |
| 4. Morning of BMT, LP | Guided imagery | Reclined position – go to meadow at Grandma's |
| 5. Radiation – sore throat | Tactile | Cold compresses, Mom/teacher rub back |
| 6. Constipation | Distraction | Video game |
| 7. General pain management | Biofeedback | Clinic appts |
| 8. | | |
| 9. | | |
| 10. | | |
| 11. | | |

Jessie requested extra rows show she can add strategies if needed.

APPENDIX II

Individualized Pain Management Programs (IPMP)

Duane is a high school junior with a diagnosis of sickle cell anemia. Duane is well known to the staff of the hospital where he is treated and the hospice in his community as a result of his frequent hospitalizations and his relationship with hospice. Duane has been receiving services from hospice since early last year when his sickle cell pain became so severe he was in the hospital more often than out. An athlete at his school, Duane was suddenly faced with the inability to play sports that which he feels defines him. In addition to physical pain, the health care team believes that Duane has psychological layers of pain for which he requires intervention, as well.

Duane's IPMP

| Duane's Individualized Pain Management Program | Interventions | Materials/Supplies |
|--|------------------------------------|--------------------------|
| Avascular necrosis – hip | Tactile | Heat, massage (Dad) |
| Avascular necrosis – hands | Tactile | Paraffin dip |
| Pain crisis – home mngmt | Home meds | Tylenol |
| " | Home meds | Oxycontin |
| Pain crisis – hospital mngmt | IV | Fentanyl |
| " | Guided imagery | Nurses |
| " | Self-hypnosis | Palliative care director |
| On-going | Writing | Pain diary |
| On-going | Cognitive behavioral therapy (CBT) | Psychologist, self |