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The Assessment and Non-Pharmacologic Treatment of Procedural Pain From Infancy to School Age Through a Developmental Lens: A Synthesis of Evidence With Recommendations[1]

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Introduction The 2011 IOM report stated that pain management in children is often lacking especially during routine medical procedures. The purpose of this review is to bring a developmental lens to the challenges in assessment and non-pharmacologic treatment of pain in young children.
Method: A synthesis of the findings from an electronic search of PubMed and the university library using the keywords pain, assessment, treatment, alternative, complementary, integrative, infant, toddler, preschool, young, pediatric, and child was completed. A targeted search identified additional sources for best evidence.
Results: Assessment of developmental cues is essential. For example, crying, facial expression, and body posture are behaviors in infancy that indicate pain: however in toddlers these same behaviors are not necessarily indicative of pain. Preschoolers need observation scales in combination with self-report while for older children self-report is the gold standard. Pain management in infants includes swaddling and sucking. However for toddlers, preschoolers and older children, increasingly sophisticated distraction techniques such as easily implemented non-pharmacologic pain management strategies include reading stories, watching cartoons, or listening to music.
Discussion: A developmental approach to assessing and treating pain is critical. Swaddling, picture books, or blowing bubbles are easy and effective when used at the appropriate developmental stage and relieve both physical and emotional pain. Untreated pain in infants and young children may lead to increased pain perception and chronic pain in adolescents and adults. Continued research in the non-pharmacological treatment of pain is an important part of the national agenda.

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DESPITE DECADES OF research in the assessment and treatment of pain in pediatrics, infants and young children still suffer unnecessary pain. Moreover, despite intense research and education over the last decade, the assessment and treatment of pain in infants and young children remain challenging with potential long-term consequences (Fitzgerald & Walker, 2009; van Dijk, Peters, Bouwmeester, & Tibboel, 2002). Pain experiences in infancy and childhood may result in long-term changes in physiological and behavioral responses to pain (Anand, & International Evidence-Based Group for Neonatal, P., 2001; Institute of Medicine, 2011). In fact, children who suffered traumatic pain were 1.5 times more likely to suffer chronic pain in adulthood while children who experienced frequent headaches were 2.2 times more likely to experience frequent headaches in adulthood (Fearon & Hotopf, 2001; Jones, Power, & Macfarlane, 2009). Unrelieved pain during infancy and childhood leads to a hypersensitivity to pain through a "rewiring" of the peripheral as well as central nervous system leading to life-long changes in pain perception (Fitzgerald & Walker, 2009; Woolf, 2007). One study of male infants circumcised within 2 days of birth indicated that they had higher pain scores when receiving two-month immunizations than male babies who had not been circumcised (Stevens, 2007). Relatedly, failure to control pain in infants with sickle cell disease has lifelong implications including poor coping strategies (Benjamin, 2008). Chronic pain in adults and children is a national and international challenge and results in suffering and increase healthcare costs. By improving the assessment and treatment of pain in early childhood, we may be able to address this challenge.

For children and infants, the pain experience often occurs during routine medical procedures such as heel sticks and vaccinations or during more severe instances of post-operative pain or pain from traumatic injuries. According to the International Association for the Study of Pain (IASP) (2012), the definition of pain is "an unpleasant sensory and emotional experience associated with actual or potential tissue damage…" (2012, para. 5). IASP explains that the lack of ability to communicate using language does not mean that a child is not experiencing pain. In order to end unnecessary pain in childhood, and its long-term consequences, we must interpret infant and child communication including verbalizations such as crying, body movements such as kicking, and facial expressions such as a furrowed brow with our knowledge of child development.

The Institute of Medicine (IOM) states that pain is a national challenge and pain management in children is often lacking even in pediatric emergency departments (Institute of Medicine, 2011). Despite the fact that there are well-validated tools available for the assessment of children's pain, more than half of hospitalized children experience severe unrelieved pain (Kortesluoma, Nikkonen, & Serlo, 2008; Twycross & Collis, 2012). This implies that either the tools are not being used to assess the pain or the pain is not being adequately treated. Hospitals in the United States are mandated to assess pain on a routine basis, and hospital policies reflect that mandate. Studies conducted in Europe show that nurses may not be consistently assessing pain, may not always believe children when they report pain, and may not treat pain adequately (Kortesluoma et al., 2008; Twycross & Collis, 2012). Although we did not find a similar study from the United States, clinical experience of pain management specialists and the IOM report demonstrate that pediatric nurses in the United States have many of the same issues.

Similar issues also arise in the treatment of pain. A study in Canada examined whether pain was addressed during routine childhood vaccinations and found that although both pharmacological and non-pharmacological interventions are available and easy to use, these interventions were not done mainly due to lack of knowledge (Taddio et al., 2009). Non-pharmacological interventions such as music, hypnosis, distraction, and massage are often successful in decreasing pain during procedures such as venipuncture and lumbar puncture as well as general pain in pre-adolescent children (Nguyen, Nilsson, Hellstrom, & Bengtson, 2010; Post-White et al., 2009; Smith, Barabasz, & Barabasz, 1996). Simple techniques are very helpful for children during medical procedures, but healthcare providers are often not introduced to these techniques during their formal education.

Factors that contribute to the difficulty in assessing and treating pain include a variety of dynamics from the child, their parents, and the health care providers. A child's physical, emotional, and cognitive development modifies their response to pain. Other aspects include the child's fear, anxiety, anger, lack of control or choice, underlying illness causing the pain, situational factors, and previous experiences with pain (McGrath & Brown, 2005). Parent and staff response to the child's fear, anxiety, or anger can also alter the child's response to pain (McGrath & Brown, 2005). Self-report remains the gold standard of assessing pain in adults, however infants, toddlers, preschool children, and non-verbal children are unable to report pain or are unable to do so reliably (Hunter, McDowell, Hennessy, & Cassey, 2000; von Baeyer, Forsyth, Stanford, Watson, & Chambers, 2009). Particularly in infants, proxy report in the form of parent report or healthcare provider observation are the common available sources of pain assessment (Buttner & Finke, 2000; Hartrick & Kovan, 2002; Pillai Riddell & Racine, 2009; Stevens, 2007). Given the large number of signs and symptoms presented by children related to their pain experience, the purpose of this article is to bring a developmental lens to the challenges of assessing and treating pain in young children.

Methods

A synthesis of the findings from an electronic search of PubMed and the general non-medical library electronic resources for the years 1980 through 2014 using the keywords pain, assessment, treatment, alternative, complementary, integrative, infant, toddler, preschool, young, pediatric, and child in combination with a targeted search to identify additional sources for best evidence was completed. The general non-medical library resources were searched specifically for