DISTRACTION METHODS IN THE MANAGEMENT OF CHILDREN'S PAIN: AN APPROACH BASED ON EVIDENCE OR INTUITION?

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Abstract
Distraction techniques are widely used in the management of children’s pain and hold considerable intuitive appeal. It is important, however, that health professionals do not rely on intuition alone and that clinical practice be guided by research. This paper reviews the evidence from both the experimental and clinical literature evaluating the efficacy of distraction techniques for children’s acute pain management. Consideration is given to why certain distractors or techniques may be more or less beneficial. Areas for further research, as well as clinical considerations are identified.

Key words: attention, child, distraction, distress, pain
In paediatric healthcare, the primary goal of pain management is to minimise the suffering of the child while facilitating the success of the medical intervention(1). There are many different approaches in the treatment of acute pain from medical procedures in children, including pharmacological and non-pharmacological methods. Non-pharmacological methods may include physical therapies, imagery, hypnosis, relaxation, systematic desensitisation, helpful coping self-statements, modelling, information provision, and distraction. Use of distractional techniques has an intuitive appeal—to the child who would rather focus on a pop-up book, to parents searching for a role to play in easing their child’s pain and distress, or to a health professional wishing to maximise a child’s compliance in the medical setting. It is important, however, for health professionals not to rely on intuition alone and for clinical practice to be guided by sound theory and well-controlled clinical research. This paper will review the evidence evaluating the efficacy of distraction techniques for children’s pain management. Particular consideration will be given to the implications of current theories of attentional mechanisms, especially why certain distractors or techniques may be expected to be more or less beneficial in different clinical contexts.

Distraction may be defined as the deployment of attention away from a particular stimulus or experience and towards an alternative stimulus. In this sense, distraction has been considered to be an ‘attentional diversion’(1). This coping strategy is to be distinguished from information avoidance, which involves habitual cognitive or physical attempts to avoid unpleasant situations. While several studies have found children’s use of distraction during medical procedures to be inversely related to their distress (2,3), an avoidant (or repressor) coping style is not generally considered to be beneficial (4).

A variety of different distractors have been used in the context of children’s pain management. These include watching cartoon videos (5,7), using party blowers (8), looking through a kaleidoscope (9), bubble-blowing (10), non-procedural talk (11), listening to short stories (12), humour and joke-telling (13), listening to music(14), puppetry (15,16), and using virtual reality glasses (17,18). Some techniques are implemented by health professionals such as play therapists (child life specialists) or nurses (19). Many, however, are well-suited for implementation by parents(20,21). Use of distraction techniques in the context of children’s painful medical procedures has also been found to have beneficial effects in easing distress in parents and health professionals (6). The implicit assumption underlying the broad range of clinical distraction interventions is that focussing on an external stimulus makes internal stimuli, such as pain, less salient and hence less distressing. However, few studies have considered just how this is achieved and whether some distractors are more effective than others in producing a refocusing of attention away from pain.

The principal rationale for distraction methods derives from “fixed capacity” theories of attentional processing (22,23). According to such theories, individuals have a limited pool of attentional resources. The allocation of these attentional resources is assumed to be under some degree of conscious control. Thus, directing a child’s attentional resources to a distractor stimulus (e.g., a pop-up book), renders fewer attentional resources available to focus on the painful or distressing stimulus (e.g., sensory input associated with needle prick during a blood test). Although more recent attentional theories suggest that early capacity models may have underestimated the complexity of the human attentional system (24), the key premises of the fixed capacity...
theory are still widely supported.

The efficacy of distraction for pain management has been investigated from a number of perspectives. One important line of evidence is from the field of behavioural neuroscience. The regional cerebral blood flow associated with the processing of a pain experience has been demonstrated to be reduced if the individual is concurrently engaged in a distraction task (25). Similarly, other research has found the activation of brain areas associated with pain, in particular the thalamus, insula, and the cognitive division of the anterior cingulate cortex, to be reduced while individuals are engaged in a demanding cognitive task (26). This reduction in activation was also found to correspond with lower self-report ratings of pain intensity. These results suggest that distraction interventions are not just something “nice” to do during an unpleasant experience, but rather that engaging in distraction interventions may modify the way in which painful stimuli are processed.

Another line of evidence on the efficacy of distraction for children’s pain management comes from clinical outcome studies, although these studies have produced mixed results. For example, of four studies evaluating whether distraction reduced venipuncture pain intensity, one found a medium positive effect size (9) and three found no significant effects (5,14,27). Whilst the results of distraction interventions have been mixed, it is noteworthy that, to date, no study has found distraction techniques to be associated with pain outcomes which are significantly poorer than those of a control group.

A meta-analysis evaluating the efficacy of distraction interventions in the management of children’s procedural pain found that, overall, distraction reduced children’s overt behavioural expressions of distress (28). However, the effect of distraction on self-reported pain intensity ratings was found to be highly variable across studies. This suggests that existing distraction techniques may have more direct effects on behavioral dimensions of pain (e.g., pain tolerance) rather than on the self-rated intensity of pain.

Moreover the variability in the outcomes of studies evaluating distraction techniques in pediatric contexts may, in part, arise from some common methodological weaknesses in many of these studies. These include: (i) a failure to employ sensitive and reliable measures of pain experience, and (ii) a lack of objective measurement of the degree to which putative distractor stimuli actually occupied the child’s attention. Recent developments in the pediatric pain field suggest some positive ways of overcoming these limitations. Future researchers should ensure that children’s pain intensity is assessed using age-appropriate measures which have been demonstrated to be valid and reliable for use with children. Some measures which meet these criteria are the Faces Pain Scale – Revised (FPS-R) (29), the Coloured Analogue Scale (CAS) (30), and the Neonatal Facial Coding System (31,32). Although there is relatively little research examining the degree to which various distractor stimuli occupy a child’s attention, Cassidy et al. (5) have reported one method that may be useful in assessing the salience of a distractor. This involves the use of an observational measure of the patient’s visual attention, whereby the proportion of time spent looking at a distractor is compared with the proportion of time spent looking at a stimulus that is associated with the onset of pain (e.g., a needle).
Very little research has examined the question of what types of distractor stimuli are more or less helpful in the context of children’s pain management. Cioffi (33) has argued that the equivocal findings regarding the efficacy of attentional interventions for pain management may be linked to a failure to give adequate consideration to the content of distracting stimuli. For example, in some situations the ‘novelty’ of a distractor may be important for engaging attention (e.g., curiosity about a new toy (1) ). However, a study conducted with very young children (between the ages of 3 and 6 years) found a greater reduction in distress during bone marrow aspirations or lumbar punctures when children listened to a familiar favourite story than when they were presented with a novel distractor (34).

In addition to the relative novelty or familiarity of a stimulus, it is likely that the affective quality of the distracting stimulus and the affective state of the child may be of importance. A cognitively based theory has been postulated to account for the relationship between affect and pain (35,36). The theory holds that valenced information or affective states can influence cognitive processes, including the appraisal, or evaluation, of a stimulus or event. Emotionally valenced information may serve as a retrieval cue for affective material in memory, which may influence perception, evaluation, expectations, and decision-making. In this way, there is a mechanism which allows positively valenced stimuli to modify the meaning of a pain stimulus, making it less negative or threatening.

Numerous studies of adults’ responses to painful conditions and procedures have found that distractor tasks with a positive affective quality lead to more favourable outcomes than distractor tasks which have a neutral or negative affective quality. Such studies have used various types of distractors, including viewing pleasant/unpleasant pictures (37, 39), reading emotive statements (40,41), listening to audio-tape narratives (42) and viewing humorous films(43). The consistent finding is that the induction of positive mood states is associated with reports of reduced perception of pain or increased pain tolerance. The one exception to this trend was a study by Greenstein (44), which found that viewing unpleasant slides led to an increase in cold-pressor pain tolerance. However, the negative slides used by Greenstein were subsequently found to be more complex, unique and significant than the pleasant slides (38). Hence, differences in pain tolerance may have reflected differences in stimulus salience and complexity rather than the affective quality of the slides.

Unfortunately, there has been relatively little research exploring the influence of the affect-related components of distraction in the pediatric context. One of the handful of studies in this area found that children who viewed age-appropriate video clips with a positive affect following minor surgery reported lower levels of pain than other children who viewed video clips which elicited a neutral or negative affect (45). While much more evidence is needed here, including applications in procedural pain contexts, it appears that the direction of the link between affective qualities of the distractor and perception of pain in children may be the same as in adults.

Health professionals utilising distraction interventions in the management of children’s pain should be mindful of a number of important clinical considerations. First, distractors should be age appropriate and, wherever possible, tailored to the preferences and interests of the child. Parents are an invaluable source
of information in this regard. Second, it is important for the parent or health professional to discuss the use of coping strategies such as distraction with the child well before the medical procedure. This will help in keeping to a minimum the provision of new information and instructions to the child during, and immediately prior to, the stressful medical experience (46, 47). Moreover, preparatory information on coping strategies enables the child to mentally rehearse how he (she) will cope with the medical procedure, thus potentially enhancing coping self-efficacy (i.e., belief in own ability to cope with the situation). Third, it is important to remember that although a child who is successfully engaged in a distraction task may show fewer overt signs of pain, he (she) may still be experiencing pain (48). Pain perception and experience needs to be thoroughly assessed, regardless of whether or not the child is displaying pain behaviours.

Researchers and clinicians alike should also be mindful of the potential limitations of distraction techniques in the context of children’s pain management. Pain is ontogenetically and probably evolutionarily disposed to interrupt attention in the normally functioning system (49). Thus, distraction may not always be possible, or may require effortful “attentional switching” which is highly demanding of cognitive resources (50). Moreover adult studies suggest that the use of distraction may be less beneficial in certain pain contexts. In particular, distraction has been found to be less effective in reducing perceived pain intensity and enhancing pain tolerance in situations where the painful stimulus is very intense or long lasting (51, 53). In these contexts, strategies which involve focusing attention on the physical sensations being experienced may be more efficacious. Relatively little research has examined the use of such sensory focusing strategies in children, with these strategies at risk of being dismissed as counter-intuitive (54, 55). Yet the success of these strategies in helping adults to cope with intense or durable pain, suggests scope for consideration in paediatric contexts, at least with older children. Notably, various hypnotic techniques, based on focusing attention on pain and re-interpreting the distress and sensory aspects, are being used increasingly in the clinical management of children’s pain (56, 57).

There may also be instances where the use of distractional techniques has the potential to result in some medical procedures being perceived by the child as more unpredictable than they otherwise would. That is, if the child is focusing on a distractor and not on what the medical/nursing staff are doing, he (she) may be surprised when a needle is inserted or when a painful limb is moved. This may be perceived as a loss of control, which may result in heightened distress levels in some individuals.

Conclusions

Distraction methods are widely used in the management of children’s procedural pain. Although distraction interventions have the potential to be highly beneficial, empirical findings concerning efficacy have been mixed. Rather than assuming that distraction always works, clinicians and researchers need to ask what makes a distractor more or less effective. Similar claims have been made in the provocative review paper titled “I know distraction works even though it doesn’t” (55). Further research is needed to address a range of questions including: (i) What features of a distractor make it more or less effective (considering a broad
range of outcome measures, such as perceived pain intensity, distress, compliance, child satisfaction and preference of coping interventions for any future procedures)? (ii) Is the efficacy of a distraction intervention dependent on the pain context (e.g., whether the pain is long lasting or very intense)? (iii) Is it possible to improve pain outcomes by matching coping strategies to certain individual difference factors? (iv) Are distraction-based interventions useful in contexts where the duration of pain may be more extended, such as for post-operative pain, disease-related pain, or chronic pain?

Distraction techniques now form part of the core armoury in paediatric pain management, especially for some professionals such as play therapists (child life specialists). Once the mechanisms of how distraction works are better articulated, improved guidelines for healthcare professionals, as well as parents, can be formulated.

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