

Evaluation of the Magic Island: Relaxation for Kids[®] Compact Disc

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Managing post-operative pain continues to elude health care professionals despite children's reports of severe pain. Although research has demonstrated that guided imagery is a beneficial complementary treatment for pain, clinicians rarely incorporate it into their practice. This study evaluated the effectiveness of a guided imagery audio compact disc (CD) in reducing post-operative pain, increasing relaxation, and stimulating imagery in children by child life specialists in the clinical setting. This cross sectional study compared pain and relaxation scores before and after the use of the CD. Sixteen children (7 to 12 years of age) reported pain on a 0 to 10 scale and relaxation on a 1 to 5 scale, and answered questions about what they imagined. Pain scores were significantly decreased, with no significant differences in relaxation scores. Findings support that school-age children are capable of using guided imagery, and relaxation may not be necessary to achieve pain reduction.

Managing children's post-operative pain continues to be a challenge because nearly 50% of children report severe pain after surgery (Gauthier, Finley, & McGrath, 1998; LaMontagne, Hepworth, & Salisbury, 2001). Effective post-operative pain management can lead to shorter lengths of stay in the hospital and better coping and emotional well being after discharge (Lambert, 1996). Analgesic medications are the most common form of pain management used with children post-operatively. However, studies report that pediatric patients suffer moderate to severe pain during hospitalization even after receiving analgesics (Gauthier et al., 1998; Gillies, Smith, & Parry-Jones, 1999; Pölkki, Pietilä, & Vehviläinen-Julkunen,

2003). The Agency for Health Care Policy and Research and the American Society of Anesthesiologists have developed guidelines that recommend the combination of pharmacological and non-pharmacological techniques to manage children's pain (Acute Pain Management Guideline Panel, 1992; American Society of Anesthesiologists, 2004). Pain results from the reciprocal relationship of sensory and affective components of a noxious stimulus (Melzak & Casey, 1968). Therefore, when a non-pharmacological intervention is combined with a pharmacologic agent for the management of post-operative pain, both sensory and affective pain may be reduced, more than with medication alone.

The need for interventions that reduce children's acute pain on a short-term basis is growing as a result of the continued demand for outpatient surgery, shortened hospital stays, and difficulties with pain management in the home. Non-pharmacologic cognitive interventions, such as guided imagery,

reduce or alter the pain experience through focus on a thought or image, thereby competing for the attention of painful sensations (McCaul & Malott, 1984). Thus, imagery has the potential to modify pain by diverting attention to a pleasant, non-painful stimulus. Relaxation can be used to facilitate imagery and may reduce pain by diminishing the effects of stress, distress, anxiety, or muscle tension (McCaffery & Pasero, 1999). The purpose of this study was to evaluate the effectiveness of a guided imagery CD in reducing post-operative pain and increasing relaxation in children. A second goal was to evaluate the effectiveness of the CD to stimulate imagery in school-age children.

Literature Review

Age Related to Pain and Imagery

Studies have shown that school-age children are able to describe their intensity of pain and appropriately make

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Objectives and the
CNE posttest can be
found on pages 296-297.

Table 1.
Sample Description (N = 17)

| | Descriptive Demographic | Total |
|--------------------|---|----------------|
| Average Age | | 9.7 (SD = 1.9) |
| Race | White | 11 (65%) |
| | African-American | 3 (17%) |
| | Asian | 1 (6%) |
| | Multi-racial | 2 (12%) |
| Gender | Male | 8 (47%) |
| | Female | 9 (53%) |
| Surgery | Appendectomy | 8 (47%) |
| | Tonsillectomy/adenoidectomy | 3 (17%) |
| | Mass excision | 2 (12%) |
| | Right total parotidectomy / right mandible resection | 1 (6%) |
| | Fracture closure | 1 (6%) |
| | Femur fracture | 1 (6%) |
| | Exploratory laparotomy/small bowel resection/appendectomy | 1 (6%) |

suggestions on pain-relieving methods to their caregivers (Pölkki et al., 2003). Children use vivid imaginations in their daily life, and can use this skill of imagination and fantasy to provide therapeutic distraction (Lambert, 1996). Children's involvement in images peaks between the ages of 8 to 12 years old (Olness & Kohen, 1996), and as children develop, they increase their ability to focus and pay attention (Thomas, 1985). School-age children can, and do, use imagery and have the capacity to create and become absorbed in vivid mental images as if they were real (Huth, Van Kuiken, & Broome, 2006).

Guided Imagery

Imagery interventions have been examined as methods of controlling pain and distress in children during intrusive procedures (Broome, Rehwaltd, & Fogg, 1998; Jeffs, 2007; Pederson, 1995; Smart, 1997). Few studies have reported the effectiveness of using guided imagery or non-pharmacological techniques in the relief of post-operative pain in children (Huth, Broome, & Good, 2004; Lambert, 1996; Pölkki, Pietilä, Vehviläinen-Julkunen, Laukkala, & Kiviluoma, 2008).

Lambert (1996) taught 26 children and adolescents (7 to 19 years of age) ways to relax and use their imaginations before and after general surgery. The study consisted of 52 patients randomly assigned to an experimental group or a control group. This technique incorporated individualized child selected images into relaxation exercises, and included suggestions for healing, minimal pain, and an uncomplicated

recovery. Children in the experimental group experienced lower post-operative pain ratings and shorter hospital stays than the control group. Twenty children indicated they used this strategy for pain control and sleep while hospitalized. A limitation of this study was that the amount of opioid in effect at the time of the intervention was not controlled.

In a descriptive study, 52 Finnish school-age children were interviewed after surgery to obtain their experiences with pain relief methods while hospitalized. Children reported 13 different types of self-initiated methods they used to relieve pain. Ninety-eight percent of the children used distraction, 31% used imagery, and 8% used relaxation (Pölkki et al., 2003).

In another experimental design, Huth and colleagues (2004) randomly assigned 73 school-age children (7 to 12) having a tonsillectomy and/or adenoidectomy to an imagery treatment group or an attention-control group. Children (n = 36) in the treatment group watched a professionally developed videotape on the use of imagery and then listened to an audiotape 1 week before surgery. They also listened to the audiotape after surgery and at home after discharge. Results indicated significantly lower pain and anxiety 1 to 4 hours after surgery in the treatment group when analgesics and trait anxiety were controlled. However, there were no significant differences at home 22 to 27 hours after discharge. A limitation of this study was the inability to provide a sham treatment for the attention-control group that would not act as distraction.

Based on the larger experimental

study described previously, Huth and colleagues (2006) analyzed how children in the treatment group used imagery before and after surgery. On an investigator developed diary, children documented the reason for listening to the imagery tape, level of relaxation, and what they imagined while listening to the tape. Data reported from a subset of 36 patients showed 78% of the patients used the tape 24 hours after surgery most often for pain management, relaxation, and sleep. Children used the imagery tape more frequently at home after surgery than before surgery. When children listened to the tape, they most often imagined going to the park, as suggested in the script.

Most recently, a randomized controlled trial tested the effectiveness of imagery and relaxation in school-age children (8 to 12 years) with a guided imagery CD (Pölkki et al., 2008). Sixty children were randomly assigned to the treatment or control group. The treatment group listened to a 20-minute CD that suggested pain-relieving imagery and relaxation. Children in the treatment group reported significantly less pain than the control group immediately after the intervention, but not 1 hour later. Nurses caring for the children were the data collectors, which may introduce bias. Other study limitations include integrity of the treatment and lack of control for the amount and type of opioid in effect at the time the intervention was given.

Methods

Despite evidence in the literature that supports the use of guided imagery to reduce pain, anxiety, and shorter hospital stays, there is an absence of research evaluating the validity of a guided imagery intervention. Therefore, the overall purpose of the study was to establish content validity for the *Magic Island: Relaxation for Kids*® CD (Mehling, Highstein, & Delamarter, 1990) and substantiate it as an effective intervention in reducing post-operative pain in children. The research questions that guided this study were:

- Does the use of the *Magic Island: Relaxation for Kids* audio CD lead to decreased pain and increased relaxation in school-age children who have undergone surgery?
- Does the use of the *Magic Island: Relaxation for Kids* audio CD stimulate the imagination in school-age children who have undergone surgery?

Design

A cross-sectional pre/post-test design was used. Children hospitalized over a 7-month period for a variety of surgeries (see Table 1) were given the guided imagery intervention.

Participants and Setting

The setting was a 475-bed, quaternary care pediatric hospital and research center in the midwest. A convenience sample of 17 children between the ages of 7 and 12 years of age who had recently undergone surgery were enrolled in the study. Children needed to understand and communicate in English because the CD was recorded in English. Only children with significant developmental delays, a diagnosed mental illness, or a neuro-muscular disorder were excluded from the study.

Measures

Demographic information for the child, including sex, age, and race, was obtained from the child and confirmed in the chart. The type of surgical procedure performed was also obtained from the child's chart.

Relaxation and Pain

An 8-question tool was used to collect data regarding relaxation and pain levels as well as details of what the child imagined after listening to the CD. This questionnaire was used in previous research (Huth et al., 2004). Relaxation and pain scores were obtained pre- and post-intervention. Relaxation was assessed using a 5-point Likert scale (1 = "very relaxed like a limp rag doll" to 5 = "very tense"). Pain was assessed using a modified version of the Oucher. The numeric scale was converted to a 0 to 10 scale with the author's permission. The original Oucher is a self-report measure of pain intensity for children 3 to 12 years of age that has been used in a variety of settings (Beyer, Villamuel, & Denyes, 1995). Children may use a numeric scale (0 to 100) or a 7-point picture photographic scale of one child (Black, Hispanic, or White) demonstrating increasing levels of discomfort. In this study, all subjects chose the numeric scale. Psychometric studies have established the content and construct validity of the original Oucher scale (Beyer & Aradine, 1986, 1987, 1988; Beyer, McGrath, & Berde, 1990). A study with 7- to 12-year-old children who had tonsillectomy pain demonstrates the high test-retest reliabilities at two separate time points ($r = 0.96$ and $r = 0.99$, respectively) (Huth et al., 2004).

Alternate reliability between three versions of the Oucher pain scale in 3- to 12-year-old children having surgical or dental pain were strong ($r = 0.88$ to 0.99), positive, and significant (Beyer & Aradine, 1986).

Children were asked if they imagined themselves being on a "magic island" or another place. If so, the child was also asked, "What did you...see, hear, smell, touch, feel, and taste?" Finally, children were asked what they liked and disliked about the CD.

Intervention

Magic Island: Relaxation for Kids (Magic Island) is a 52-minute step-by-step audio guide using music and narration to teach children how to relax. Beginning with a tension-release exercise to loosen tight muscles and relieve physical stress, and with a background of music, the storyteller depicts an imaginary journey by hot air balloon to a magic island. The child is encouraged to breathe deeply, to improve oxygen circulation and calm the body. *Magic Island* features three relaxation tools: tension/release exercises, deep breathing, and guided imagery to quiet the mind and expand the imagination.

Procedure

Institutional Review Board approval was obtained for this study, and pre-treatment verbal consent and assent were obtained from parents and children. Participants were identified and recruited during post-surgery recovery on two designated inpatient surgical units by their child life specialist. The use of guided imagery is a part of the standard of care in this medical center, and written consent is not usually obtained. Child life specialists explained the guided imagery process to parents and children after obtaining a agreement to participate in the study. Following documentation of an initial pain and relaxation score, the child was provided with a headset and a portable CD player to listen to the *Magic Island* audio recording (Mehling et al., 1990). After the CD was completed, pain and relaxation scores were once again obtained from the child by the child life specialist. Then the 8-item imagery assessment questionnaire was completed.

Statistical Analysis

Analysis was performed using the Statistical Analysis System (SAS 9.2). Descriptive and frequency analyses were used to summarize demographic variables. A paired *t*-test was conduct-

ed to examine the relationship between pain and relaxation before and after listening to the CD. Post-hoc effect size was calculated using Cohen's *d*. A Spearman correlation coefficient was obtained to determine the relationship between pain and relaxation after the intervention. Answers to questions regarding imagery outcomes were categorized using content analysis. All analyses were carried out at a 0.05 level of significance.

Results

Description of Sample

Nine female and 8 male children with a mean age of 9.7 ($SD = 1.9$) participated in the study; 11 were White (65%), 3 African American (17%), 1 Asian (6%), and 2 multi-racial (12%). One child assented but did not participate. Additionally, 2 children and 3 parents refused participation. The most frequent type of surgery performed was an appendectomy (47%, $n = 8$). These demographics are presented in Table 1.

Pain and Relaxation

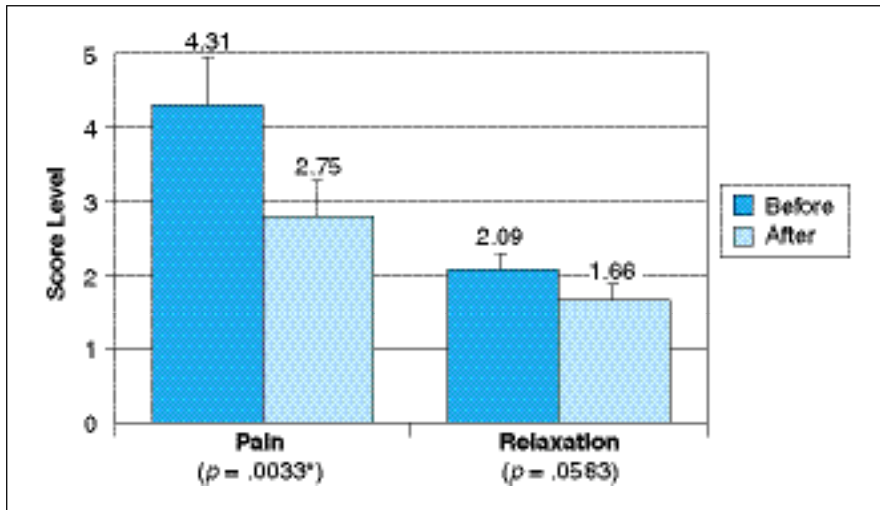
Comparisons of pain and relaxation scores before and after the child listened to the guided imagery CD are shown in Figure 1. One child's pain scores were missing. Mean pain scores before the CD were 4.31 ($SE = 0.61$) and after the CD were 2.75, ($SE = 0.49$, $t[15] = 3.49$, $p = 0.0033$). A large post-hoc effect size for pain reduction was calculated at 0.87 (Cohen, 1988). Eleven (68.7%) children reported less pain, 4 (25%) reported no change, and 1 (6.2%) child reported slightly higher pain after listening to the CD.

Mean relaxation scores were 2.09 ($SE = 0.23$) prior to the CD and after the CD were 1.66 ($SE = 0.14$). Decreasing relaxation scores indicate more relaxation. Thus, there were no significant difference in relaxation scores ($t[15] = 2.05$, $p = 0.0583$). There was a moderate effect size for relaxation (0.51). Eight (50%) of the children reported more relaxation after listening to the CD, 6 (37.5%) had no change, and 2 (12.5%) reported less relaxation. A correlation between imagery and relaxation after listening to the CD indicated a medium relationship that was not significant ($r = 0.33$, $p = 0.22$).

Imagination

Listening to the CD stimulated the imagination of 14 (82%) of the 17

Figure 1.
Comparison of Pain and Relaxation Scores



children. Three (18%) children did not imagine being on a magic island or anywhere else. The most frequently reported senses were visual (82%), auditory (76%), and tactile (76%). The least reported sense was taste (29%). Table 2 lists the frequency of answers on the senses used and the images elicited. For example, a child may have visualized several things such as flowers, trees, birds, and water. In answer to the question, “What did or didn’t you like about the CD?”, eight children stated they liked everything, four liked how it made them feel, and three liked all of the CD. The three children who did not imagine anything also disliked the CD, and stated it was “annoying,” “weird,” and didn’t like “what they were talking about.” Six children made comments about the parts of the CD they didn’t like. For example, “the beginning,” “the stretching part,” “made me sleepy.”

Table 2.
Frequency of Answers to the Imagery Assessment Questionnaire

| Question | Images | Frequency | Percent Responding |
|---------------------|--------------------------|-----------|--------------------|
| What did you see? | | | 82% |
| | Animals/living creatures | 8 | |
| | Water | 8 | |
| | Plants/flowers | 7 | |
| | People | 4 | |
| | Nature | 4 | |
| | Sand | 3 | |
| What did you hear? | | | 76% |
| | Animals/living creatures | 7 | |
| | People | 6 | |
| | Water | 5 | |
| What did you touch? | | | 76% |
| | Animals | 4 | |
| | Sand/beach | 4 | |
| | Balloon | 3 | |
| | Rocks | 3 | |
| | Trees/plants | 3 | |
| What did you feel? | | | 71% |
| | Tactile | 8 | |
| | Affective | 3 | |
| What did you smell? | | | 65% |
| | Food | 5 | |
| | Plants/flowers | 5 | |
| | Not know | 3 | |
| What did you taste? | | | 29% |
| | Nothing | 8 | |
| | Food | 4 | |
| | Ocean | 1 | |

Two specifically commented on the ending, and one child “wanted to hear more about the island.”

Validity

To the investigators’ knowledge, no studies have been conducted to assess validity of a guided imagery audio CD (or tape) since this study’s inception. Therefore, the *Magic Island* CD was given to 3 guided imagery experts for review and to establish content validity. The group of experts consisted of two PhD-prepared pediatric professionals, a nurse researcher, a psychologist, and a highly experienced child life professional who currently uses the *Magic Island* CD in her daily practice. Overall, all three experts were in agreement that the audio CD provided children with a wide variety of sensory identification opportunities. Weaknesses included the length of the narrative (52 minutes, considered possibly too long) and lack of opportunities for touch and taste.

Discussion

In this study, children who used an imagery audio CD had lower self-reported pain from pre- to post-intervention but no significantly increased relaxation. Therefore, there were mixed findings to research question 1. The effect for pain is similar to other findings in which imagery reduced post-operative pain in the hospital or ambulatory setting (Huth et al., 2004; Lambert, 1996; Pölkki et al., 2008). The lack of a treatment effect on relaxation is a new finding and has not been previously supported or refuted in the literature on guided imagery with children. Hypnotic methods do not necessarily result in relaxation because a cognitive process of absorption occurs (Barber, 1996). Thus, it is plausible to think that children were absorbed in the imaginative process of the CD and not the relaxation. It is interesting to note that 9 (53%) children had difficulty understanding the meaning of the word “relaxation.” Their parents often provided explanations to the meaning of the word “relaxation.” Further, the lack of significance between pain and relaxation after the intervention may support the previous arguments but may also be a result of the small sample size.

There is little empirical evidence that supports children’s imagery ability and content. Our findings support research question 2. Others have also found that school-age children are

able to imagine their favorite or familiar people, places, and animals (Huth et al., 2006; Lee & Olness, 1996; Smart, 1997). The findings from this study indicate that 82% of the children reported being on a magic island. This is similar to previous reports in which the majority of children imagined going to the place suggested in the audio tape or CD (Huth et al., 2006; Smart, 1997). Children in this study were able to deviate from the CD because they imagined other content, such as flora, animals and pets, and people. Likewise, Huth and colleagues (2006) reported that children imagine animals and pets, but also imagined familiar places, sports events, and special events. Children in this study were able to use their senses to see, hear, touch, feel, smell, and taste. As identified by the content experts and collaborated by the children in this study, taste was a weakness of the senses represented on the CD. Imagery evokes mental images that involve the senses (Naparstek, 1994). The frequency of senses used by school-age children during imagery has not been previously reported. Additionally, the content validity of a guided imagery audio CD has not been established. Therefore, these results can help ensure that health care professionals use an intervention that has preliminary validity testing.

Limitations

Several limitations should be considered when interpreting these findings. Most importantly is the lack of randomization and lack of a control group. Second, there was no control for the medications given, the type of surgery, or the number of days since the surgery and intervention. Finally, the small sample size limits generalizability. Interestingly, power analyses after data collection indicated that effect size for the reduction of pain was large and moderate for relaxation.

Implications for Practice And Research

Despite these limitations, this study provides evidence that children ages 7- to 12-years-old were able to use guided imagery in the hospital setting. Cognitive distraction is a frequent coping strategy used by school-age children. Therefore, health care professionals should use this intervention to give children a sense of control and assist them in coping during hospitalization. Both imagery and relaxation on the CD may provide the child with

a variety of coping methods to address the stress of pain, illness, and hospitalization.

Health care professionals may need a training session on administration of any imagery CD that is used. For example, information on deep breathing, muscle relaxation, imagery, and listening to the CD will provide the health care professional with the ability to answer questions from children and their parents (Huth et al., 2006). Assessment of the child’s likes and dislikes, current distress/anxiety level, and past coping strategies used during pain will help prevent distress when listening to the CD. Olness and Kohen (1996) have stressed the importance of letting children know they can imagine going any place. In fact, letting a child tailor the imagery content may increase their imaging ability. In the event a child does become distressed when listening to the CD, the child and parent can be instructed to turn off the CD and notify the health care professional (Huth et al., 2006). Documentation of the child’s reaction to the CD and current pain level is necessary because this is a therapeutic intervention. Using an imagery CD requires minimal time from health care professionals (Lambert, 1996). Further, an imagery CD is a low-cost intervention that has the potential to result in improved coping and pain management both in the hospital and at home.

Health care professionals should encourage children and parents to use cognitive-behavioral pain-relieving methods, such as imagery, relaxation, and breathing techniques. Effective pain management can lead to shorter lengths of stay and better coping and emotional well being after discharge. These techniques can be reinforced at discharge and used at home. These preliminary findings can be used to ensure that health care professionals are using a guided imagery intervention that is supported by empirical evidence. Future research could focus on comparing imagery CDs that are individualized to the child’s favorite place or activity to a standardized imagery CD. Research that explored capturing children’s attention capacity during times of stress and pain would also advance pediatric nurses’ knowledge and understanding of imagery.

Conclusion

This study examined the efficacy of a commercial guided imagery CD in reducing school-age children’s post-operative pain, increasing relaxation,

and stimulating imagery. Imagery was effective in reducing children's reported pain but was ineffective in increasing relaxation. These findings support that relaxation is not necessary for pain reduction. Children were able to use their senses and imagine going to a magic island when listening to the CD. Thus, there is preliminary content validity for this guided imagery CD. Health care professionals need to be educated to administer non-pharmacologic interventions, such as guided imagery. It is hoped that this pilot study will assist health care professionals in implementing therapeutic interventions for children who continue to suffer pain. Children and parents should expect and demand care based on research findings.

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