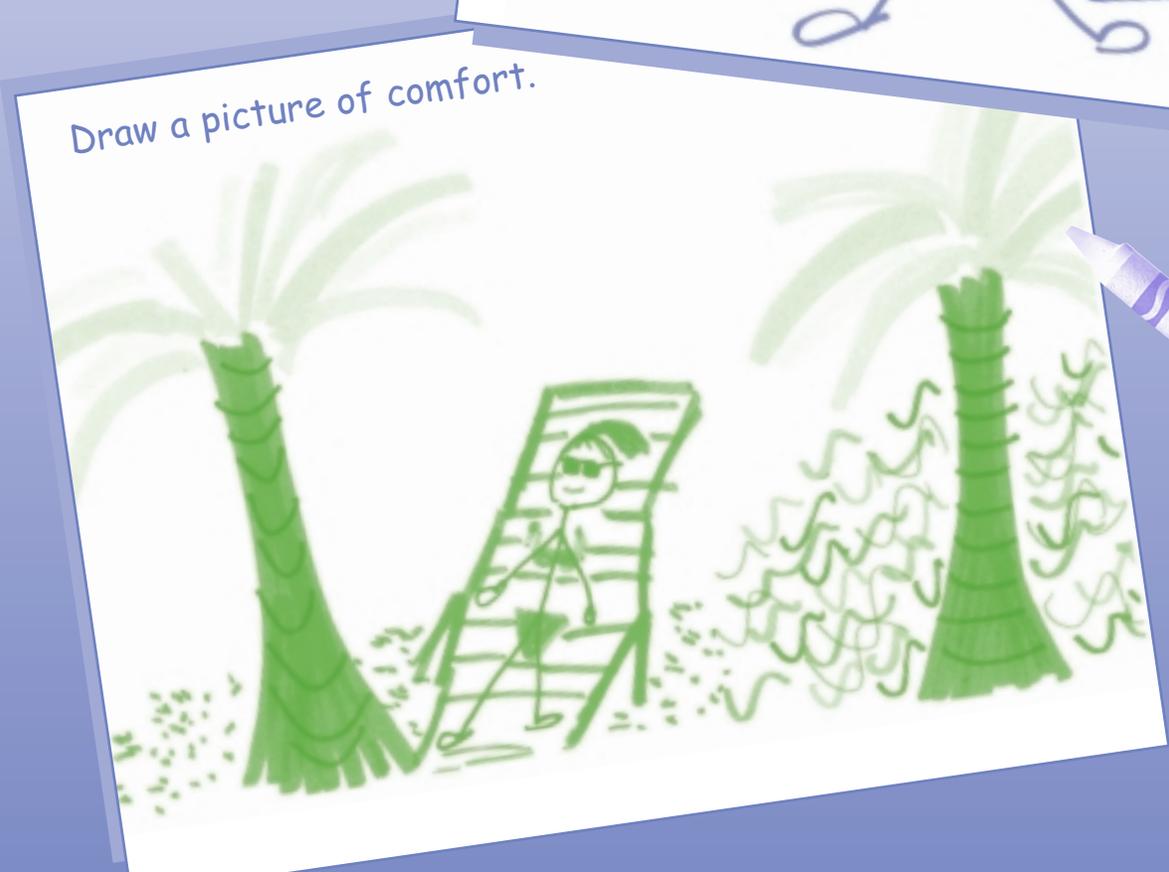
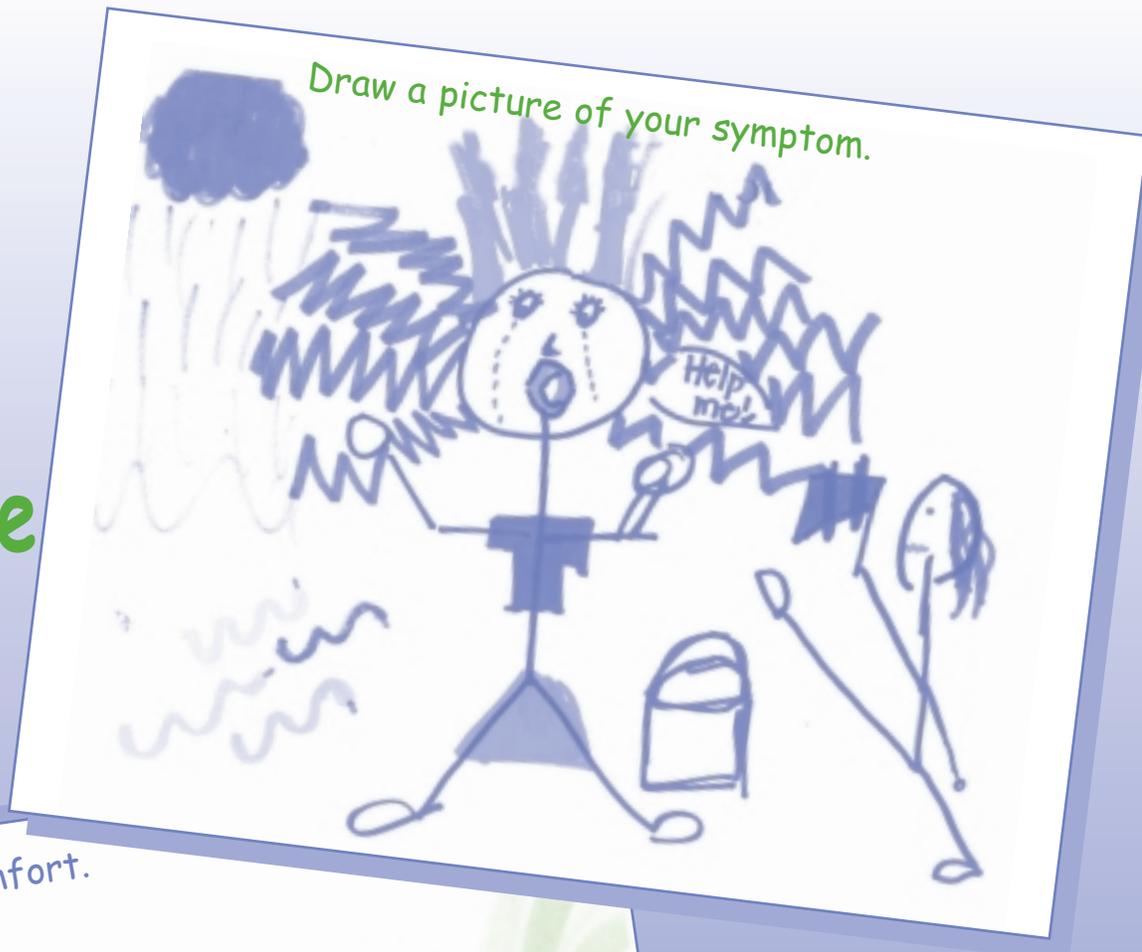


Special  
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Pediatric  
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## SPECIAL ISSUE ARTICLE

# Helping Children with Stress and Anxiety: An Integrative Medicine Approach

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*Abstract: This article provides an overview of integrative therapies that have been proven effective in the treatment of anxiety and stress-related disorders in children. Anxiety disorders are among the most common type of psychological disorders found in children. Further, stress and anxiety often play a mediating role for many pediatric psychophysiological disorders (i.e., chronic headaches, stomachaches, and sleep disorders). Clinical and empirical evidence is reviewed to support an Integrative Medicine Approach for the treatment of anxiety and stress-related disorders.*

## Introduction

Stress, anxiety and fears are common in children, and activate the familiar "fight-or-flight" response. Normal stressors that children experience include taking an exam, playing basketball in a close game, attending a new school, and dealing with illness. When children are stressed their hearts beat faster, respiration rate increases, muscles tense up, and hands may get cold and sweaty.

Some children are more vulnerable to stress and anxiety secondary to heightened physiological reactivity, certain temperament qualities and personality characteristics, and heritability factors (Bauer et al., 2002; Jemerin & Boyce, 1990; Gunnar et al., 1997; Boyce et al., 2001; Compas et al., 2001). Further in today's society many children are in a chronic state of overstimulation and physiological stress (Ditchek & Greenfield, 2001). This state of prolonged and excessive cardiovascular, electrocortical and hormonal activation, called "allostatic load" (McEwen, 1998), is associated with suppressed immune function, health and behavior problems, and may lead to chronic

conditions.

Many studies have documented the mediating role of stress for many pediatric psychophysiological disorders, such as chronic headaches, stomachaches, and sleep disorders. It is estimated that up to 20% of children will experience significant psychophysiological symptoms at some point in their development (Haggerty et al., 1993). Children need help to develop coping skills which allow them to change the way they perceive and react to stress.

Anxiety disorders are among the most common type of psychological disorders found in children and adolescents. Prevalence rates of anxiety symptoms in nonreferred children have been reported to be between 10 and 30% (Bernstein et al., 1996). Manifestations of anxiety in children include anxiety associated with medical procedures, separation anxiety, school avoidance, social and performance anxiety, specific phobias, somatic complaints, post-traumatic stress disorder, generalized anxiety disorder, panic disorder and obsessive-compulsive symptoms.

When deciding if a child's anxieties, worries or fears meet diagnostic criteria for an anxiety disorder, health professionals consider the intensity, frequency, duration and manner in which symptoms are expressed. Clinical treatment is warranted when the anxiety causes significant distress and/or functional impairment for the child. Parents of anxious children often set low limits for autonomy, increase their control over activities, and underestimate their child's coping skills. This article will provide an overview of integrative therapies that have been combined with the empirically-supported cogni-



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tive/behavioral approach for the treatment of stress and anxiety in children.

## Integrative Medicine Approach

The fields of pediatric medicine and child mental health are changing in response to consumer driven interest in more holistic models of assessment and treatment. Today's consumers want additional choices, less invasive and more natural treatment options as well as a culturally sensitive approach to health care for themselves and their children. An integrative medicine approach provides a more comprehensive model for pediatric health care that recognizes the importance of the physical, emotional, intellectual and spiritual domains. It emphasizes each child's autonomy, responsibility and participation in their own health and wellness. For a complete discussion of the definition of complementary/alternative medicine and integrative therapies ("CAMIT") the reader is referred to Dr. Culbert's article in this issue entitled "Integrative Approaches in Pediatrics: Biofeedback in the Context of Complementary/Alternative Medicine."

Integrative therapies that we have used for treatment of stress and anxiety problems are listed in Figure 1.

**Integrative Therapies for Anxiety and Stress-Related Disorders:**

*Self-regulation skills training:*

- biofeedback
- breath control training
- self-hypnosis
- autogenic training
- progressive muscle relaxation

*Cognitive/behavioral Therapy*

*Meditation*

*Clinical Aromatherapy*

*Massage Therapy*

*Exercise Consultation*

*Bibliotherapy*

Figure 1

**Self-Regulation Skills Training**

Research has shown that parents are increasingly interested in mind-body techniques for their children and are seeking out non-pharmacological treatment options (Spiegelblatt, et al., 1994). Self-regulation skills training suggest that the child can learn to “be the boss of his body” and regulate emotional, cognitive, behavioral and physical reactions to stress. Self-regulation skills training helps anxious children modulate these processes in desired directions and develop a sense of self-efficacy, i.e., feelings of mastery and control.

We have found that the most effective method for teaching children self-regulation skills is with biofeedback techniques. Biofeedback, with its computerized, video game-like quality, is culturally syntonetic with today’s youth and well accepted in mainstream pediatrics. Multimodal biofeedback training can play a powerful role in mind-body education for children with anxiety by illustrating that a change in your thinking causes a change in your body in a very immediate and concrete fashion (Culbert, Kajander, & Reaney, 1996). Psychophysiological stress profiling is a helpful tool to identify the child’s individual stress response and demonstrate mind-body linkage. Learning self-regulation skills empowers children with anxiety to focus their mind in a way that positively affects

their body. Biofeedback modalities including electrodermal activity (EDA), heart rate variability (HRV), peripheral temperature and diaphragmatic breathing (pneumography or capnography) have been proven to be effective treatments for children with anxiety and stress-related symptoms.

David Mars (1998) and Donald Moss (2002) have outlined mind-body treatment protocols for individuals with anxiety disorders, including panic attacks, performance anxiety, generalized anxiety disorder, and specific phobias. Children with anxiety disorders, especially panic disorder, often have respiratory patterns that include very shallow breaths, breath-holding and hyperventilation, thus driving their CO2 values down. This lowered level of CO2 (hypocapnia) induces cerebral vasoconstriction and hypoxia and increases sympathetic nervous system arousal. By teaching diaphragmatic breathing skills and training children to exhale to a normal level of end-tidal CO2 (38-42 Torr), children with panic symptoms are able to restore proper physiologic balance. In this state, they are able to think more coherently and utilize cognitive/behavioral coping skills for managing their anxiety.

Diaphragmatic breathing (or “belly breathing”) is easy to teach to most children. Kajander and Peper (1998) provide helpful clinical tips for teaching diaphragmatic breathing skills to children. Breath work can be used to relieve stress, anxiety and fear. It can also enhance a child’s self-awareness of what is going on in his/her body. Diaphragmatic breathing is thought to have a positive effect on every system in the body. It slows the heart rate and restores respiratory sinus arrhythmia (RSA), stimulates the immune system, and increases peripheral warming (Schwartz, 1995; Gevirtz, 1999; von Scheele, 1988). Children tend to like breathing exercises best, and find they can apply it to many aspects of their lives.

Hypnosis is also an effective treatment for children who have anxiety problems (Griffen, 1999, Olness & Kohen, 1996, Schultz, 1991). Hypnosis is defined as a state, which is often, but not necessarily, associated with relaxation in which the child is able to focus attention on the accomplishment of specific behavioral or

physiologic changes (Olness & Kohen, 1996). Depending on the child’s individual situation, hypnotherapy can be used as a complement to psychotherapy or as a primary treatment. Hypnosis and biofeedback share several common characteristics and work well together in an integrative approach (Culbert, Reaney, & Kohen, 1993). Hypnotic interventions for the treatment of phobias, social anxiety and performance anxiety rely heavily on desensitization. Children are taught self-hypnosis and they experience feelings of safety and mastery while confronting feared stimulus via imagery. Post-hypnotic suggestions are given for the child to experience the same feelings of mastery and control in real world situations.

Progressive muscle relaxation (PMR) exercises help children discover where tension is being held in their bodies and teaches them to recognize and control the feeling of muscle tension. PMR reduces blood pressure, respiration rates, and anxiety, and is a fun way for children to relax all of their muscles in an organized fashion. Electromyograph (EMG) biofeedback can be combined with PMR training to help children discern where tension is being held in their bodies.

Autogenic training (AT) is another approach for managing stress and anxiety. Autogenic phrases are organized into exercises that are physiologically oriented. There are six standard exercises, during which the individual performs mental repetitions of specific body sensations. This self-regulation technique offers a helpful way to become more aware of how your body feels. Thermal biofeedback can be combined with autogenic training to demonstrate whether using this technique has produced lowered sympathetic nervous system arousal.

**Cognitive/Behavioral Therapy**

Cognitive/behavioral therapy (CBT) is the conventional treatment modality for anxiety disorders. This empirically supported treatment approach involves an integration of cognitive, behavioral, affective and social strategies for change based on learning principles (Kendall et al., 1992). It addresses the role of distorted thoughts in the onset and maintenance of anxiety disorders. Common errors made by anxious children include: overestimating probability

(i.e., “mom is late, she was in a car accident”) and overestimating consequences (i.e., “my mistake will be the end of the world.”). CBT includes exposure-based interventions such as systematic desensitization with a fear hierarchy and gradual or intense exposure. Within the self-regulation skills training framework, we have used cognitive techniques including self-monitoring, symptom diary, positive self-talk, refuting irrational beliefs, problem-solving, self-reinforcement, contingency management, and modeling.

### **Meditation**

Like other mind/body therapies, meditation can bring deep states of relaxation, decrease anxiety and improve physical symptoms. Meditation is a self-directed practice for relaxing the body and calming the mind. Joan Borysenko (1988) defines meditation simply as any activity that keeps the attention anchored in the present moment. There are three basic kinds of meditation: concentrative, awareness, and expressive. Research has supported the efficacy of a mindfulness-based group meditation program for adults with generalized anxiety disorder or panic disorder (Kabat-Zinn et al., 1992, Miller et al., 1995).

### **Clinical Aromatherapy**

Clinical aromatherapy is the therapeutic use of essential oils, which are aromatic compounds derived from plants, for the treatment of a variety of problems including nausea, pain, insomnia and anxiety (Battaglia, 1995, Price & Price, 1999). Essential oils can be directly applied to the skin, inhaled or ingested. They are believed to work at the psychological, spiritual, physical and cellular levels (Buckle, 2002). Research in aromatherapy is just emerging, but in our clinical experience, children with stress and anxiety have benefited from aromatherapy as an adjunctive therapy. Over 50% of children seen for aromatherapy in our clinic have chosen sweet orange for reducing anxiety. Children have also found lavender, mandarin, frankincense, bergamot and ylang-ylang helpful for stress and anxiety problems.

### **Massage Therapy**

Therapeutic massage is the gentle manipulation of the body's soft tissues. Its purpose is to promote circulation of blood and lym-

phatic drainage, relax muscles, relieve pain, reduce anxiety and enhance overall health. From extensive studies, Tiffany Field and colleagues at the Touch Institute report that massage is effective in reducing stress hormone levels and anxiety in children with chronic illness (Field et al., 1998, 1997), post traumatic stress disorder (Field et al., 1996) and psychiatric illness (Field et al., 1992).

### **Exercise Consultation**

Researchers have found that exercise can decrease anxiety and depression, improve an individual's self-image and buffer against stress (Sacks, 1993). More children are becoming interested in yoga as a tool to manage stress. Yoga has been proven to enhance fitness, flexibility and mood through the use of meditative awareness, breathing exercises and physical postures.

### **Bibliotherapy**

The use of books and articles to be read during or between sessions can be a useful adjunct to other integrative approaches. Please refer to the suggested resource list at the end of this article. Materials include stories about body functioning, stress and anxiety, such as *Your Insides* (Cole, 1992); *Stress Can Really Get on Your Nerves* (Romain & Verdick, 2000); and *Lets Talk about Feeling Afraid* (Berry, 1995). Workbooks on similar topics can be effective for teenagers, such as *Mastery of Your Anxiety and Panic* (Bourne, 2000) and *Fighting Invisible Tigers: A Stress Management Guide for Teens* (Hipp, 1995). Books on specific clinical issues (i.e., obsessive-compulsive disorder) are also available. Self-help books for parents are also available, such as *Helping your Anxious Child* (Rapee et al., 2000) and *Stress-proofing your child: Mind-Body Exercises to Enhance your Child's Health* (Lewis & Lewis, 1996).

### **Treatment Planning Model**

The *Discern-Control-Generalize* model (Stroebel, 1977; Culbert & Banez, in press) offers a useful paradigm for treatment planning. In the *discern* phase, children with anxiety learn how to identify stressors and are taught about mind/body links. They record stressful events, thoughts, feelings, and physical reactions. Self-monitoring of

symptoms is encouraged and positive expectations are established. Biofeedback training focuses on discriminating differences between relaxation and anxiety. In the *control* phase, children learn to modulate anxiety and associated sympathetic nervous system (SNS) arousal. Children are coached to master specific skills (belly breathing, self-hypnosis, RSA, autogenics, PMR). They establish certain preferences and home practice is reinforced. Cognitive-behavioral therapy focuses on changing attributions and refuting irrational ideas. In the *generalize* phase, children learn how to apply their self-regulation skills in real-life situations. Desensitization exposure is planned, allowing children's feelings of mastery and control to increase.

### **Our Experiences**

In their 1998 article in *Biofeedback*, Timothy Culbert and Judson Reaney asked the question: “What if every child and adolescent received ‘stress inoculation’ training and developed awareness of mind/body bidirectional influences and their ability to control these factors at each stage of development?”

The Integrative Medicine Clinic at Children's Hospitals & Clinics in Minneapolis, Minnesota provides this type of training for our pediatric patients. The clinic opened in July, 2001. The professional staff includes Timothy Culbert, MD, Medical Director and Lynda Richtsmeier Cyr, PhD, Pediatric Psychologist and Program Manager. Our program provides inpatient and outpatient clinical services. Staff members place a priority on safety and scientific evidence in identifying complementary/alternative therapies that can be blended with conventional approaches into effective, affordable treatment plans. The majority of patients seen at our clinic have chronic illness (asthma, cystic fibrosis, cancer, irritable bowel syndrome), chronic pain issues (migraine and tension-type headache, recurrent abdominal pain, fibromyalgia, and back pain), and related symptoms of stress and anxiety.

Our clinic offers children and families a variety of assessment, treatment and consultative services. Clinical services include holistic assessment by an individual provider or an interdisciplinary team, per-

sonalized information/resource consultation and a broad range of individual or multimodality treatment approaches. These include self-regulation skills training, biofeedback, relaxation/mental imagery, mind-body skills group therapy, exercise/fitness program consultation, nutritional consultation, spiritual guidance, academic therapy, massage therapy, aromatherapy, acupuncture, healing touch and herbals/botanical consultation. Our own internal survey revealed that, on average, 52% of our pediatric patients are using complementary and alternative medicine and integrative therapies.

Our treatment protocol for stress and anxiety includes assessment, intervention and follow-up activities (see Figure 2). Clinical assessment is needed to determine appropriate treatment modalities. During assessment, the clinician also has the opportunity to re-frame the problem and educate the child on mind/body linkages.

Assessment of all dimensions of anxiety disorders (physiologic, behavioral, psychological, and cognitive) is needed within a developmental framework. Eliciting the child's experiences with the problem and description of symptoms is also important for treatment planning. Multimodal interventions are utilized and self-regulation skills training follows the *Discern-Control-Generalize* model. Finally, planning follow-up activities is important and will prevent relapse at times of increased stress.

The Anxiety, Stress, and Health Clinic at a Stanford-affiliated child mental health agency was developed in 1995 by Pamela Kaiser, Director. Comprehensive assessments were standard, including understanding self-regulation, psychological, academic, family and peer dynamics. An individualized treatment plan was developed in collaboration with the parents, child, referring primary care provider and/or subspecialist, classroom teacher, and other needed interdisciplinary experts. The following case example reflects such a plan.

## Case Example

The following case example illustrates the importance of comprehensive assessment. It demonstrates that self-regulation and cognitive-behavioral techniques can often be applied to concurrent disorders and difficul-

### Treatment Protocol for Stress and Anxiety:

#### Assessment

- evaluate experience with the problems
- obtain descriptions of the symptoms
- consider developmental issues
- re-frame the problem, mind/body education
- rule out medical conditions
- assess motivation, positive expectancy

#### Multimodal Intervention

- a. Cognitive-Behavioral Training and other psychotherapies
- b. Self-regulation skills training
  - self-monitoring
  - mind/body education
  - psychophysiologic stress profiling
  - biofeedback, PMR, self-hypnosis, breath work, RSA training
  - home practice program established
- c. School consultation
- d. Pharmacotherapy

#### Follow-up activities

- reinforce feelings of mastery and control
- reinforcement for practice and success
- schedule follow-up appointments

Figure 2

ties, even when anxiety treatment goals are prioritized.

Kathy was a 12 year old who was referred by her pediatrician for treatment of an extreme fear of shots and blood. In addition to Kathy's (and both parents') severe needle/injection/blood phobia, the clinical assessment revealed that she was a gifted and highly creative child struggling with symptoms that met criteria for Bipolar Disorder, OCD, ADHD, and Math Learning Disability. Further, marital discord, parental anxiety, and enmeshed parent-child interactions further reinforced Kathy's panic episodes, inability to sleep alone, and dramatic vacillations between helplessness and oppositionality.

Due to school district pressures, Kathy and her parents agreed that working on the needle phobia was the initial priority. She quickly grasped the visual displays about the mind-body connection, panic response, and feeling thermometer. Her parents agreed to regular collateral counseling sessions focused on parenting changes that fostered Kathy's self-confidence that she was competent to manage anxiety provoking situations. Resources for marital therapy were given.

Self-regulation skills were taught to facilitate modulation of psychophysiological reactivity, mood, impulsivity, as well as her anxiety related to needles, math performance, and bedtime. Her vivid imagination prompted strong responsiveness to learning self-hypnosis and diaphragmatic breathing ("blowing the worries far in to the stratosphere"). She embellished the 0-10 scale of emotional control with elaborate drawings for her bulletin board. Her impatience and low frustration threshold demanded rather easily attained biofeedback parameters and frequent changes in visual displays.

Progressive muscle relaxation was rejected. When Kathy began to relate specific instances using self-regulation strategies in her every day life, her parents were invited to join a session so that she could explain and demonstrate the skills.

Cognitive-behavioral approaches were then introduced. A fear hierarchy was established, followed by exposure response prevention (ERP) and other cognitive "tricks". Bibliotherapy provided two-dimensional exposure of a picture story of young children getting immunized at the doctor's office. Next, three-dimensional exposure of the medical equipment for injections began with small, cloth play materials followed by a plastic toy medical kit. Nonfunctional play with real syringes, tourniquets, alcohol swabs and Band-Aids utilized all senses and elicited humor in order to further decrease the association with fear, including water syringe fights, dabbing alcohol as perfume, tourniquets bracelets, and arm and face decoration of multiple Band-Aids.

Collaboration with the injection nurse followed, in order to accurately simulate exposure to the upcoming procedure as well as to maximize a supportive, calm milieu for Kathy at the pediatrician's office. ERP

was combined with self-regulation coaching, initially using a doll, then the clinician, and finally, Kathy. In between these sessions, Kathy and her mother met with the nurse on three occasions, culminating in a "dry run" at the final visit. For the actual injection Kathy calmly used her "strategies" and a lot of humor; she did not solicit the prearranged backup assistance from this clinician or her mother. On subsequent visits, the second and third injections went smoothly. Once the series was completed, Kathy got her ears pierced!

Other interventions were made, including dyadic (mother-child) psychotherapy, referral to a Bipolar Disorder Clinic to confirm diagnoses and complete a medication evaluation, academic modifications and tutoring, and behavioral interventions to address the ADHD, oppositional, and sleep issues.

## Conclusion

Anxiety and stress-related disorders are common and highly treatable conditions in our pediatric population. Both research and clinical experience support the efficacy of mind/body therapies (biofeedback, self-hypnosis, CBT, breath control training) as effective self-management approaches for children with stress and anxiety problems. Children enjoy biofeedback sessions and they quickly learn how to control the psychophysiological symptoms of stress and anxiety. Additionally, CAM therapies, such as massage, clinical aromatherapy and exercise can be helpful in managing anxiety symptoms. However, the need for psychotherapy and/or medication therapy as a primary or adjunct intervention must always be considered.

We submit that an integration of self-regulation skills training, conventional cognitive/behavioral therapy, and CAM therapies provides an effective contemporary, holistic treatment approach for pediatric patients. It would not be surprising that in the near future additional research will further support an integrative medicine approach as the treatment of choice for pediatric anxiety disorders.

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i \*Authors Note: The term Complementary and Alternative Medicine or "CAM" is well recognized in the scientific literature but is problematic for a number of reasons as explained later on in this article. For the sake of inclusiveness and to reflect the authors' explicit preference for terminology that reflects a more collaborative, holistic approach, we have chosen to use the phrase "complementary/ alternative medicine and integrative therapies" — abbreviated "CAMIT." This retains the familiar stem of CAM but suggests moving beyond an "either/or" model to a paradigm that includes integration of the best of all available therapies for children and families in a way that respects cultural, spiritual and personal beliefs and preferences.

## Author Correction:

An error has been identified in part one of the article, Active sEMG Training Strategies for Chronic Musculoskeletal Pain, by Randy Neblett, which appeared in the summer 2002 issue of Biofeedback (Volume 30, number 2). A "web" placement was described, in which one active electrode is placed on the web of the hand and one electrode is placed on the forearm. The supraspinatus muscle, which is a muscle of the shoulder, was incorrectly identified! The correct muscle is the brachioradialis, which is on top of the forearm, just below the elbow.