

Home Study Program

Management of preoperative anxiety in children

The article "Management of preoperative anxiety in children" is the basis for this *AORN Journal* independent study. The behavioral objectives and examination for this program were prepared by Rebecca Holm, RN, MSN, CNOR, clinical editor, with consultation from Susan Bakewell, RN, MS, BC, education program professional, Center for Perioperative Education.

Participants receive feedback on incorrect answers. Each applicant who successfully completes this study will receive a certificate of completion. The deadline for submitting this study is Nov 30, 2009.

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BEHAVIORAL OBJECTIVES

After reading and studying the article on managing preoperative anxiety in children, nurses will be able to

1. discuss factors associated with increased levels of anxiety in children,
2. describe opportunities for interdisciplinary collaboration in relieving preoperative anxiety in children,
3. explain use of a family-centered approach to relieving preoperative anxiety, and
4. identify interventions to prevent preoperative anxiety according to a child's developmental stage.



This program meets criteria for CNOR and CRNFA recertification, as well as other continuing education requirements.

A minimum score of 70% on the multiple-choice examination is necessary to earn 5.6 contact hours for this independent study.

One contact hour is equal to 50 minutes.

Purpose/Goal: To educate perioperative nurses about how to manage preoperative anxiety in children.

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Management of preoperative anxiety in children



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In 1996, children in the United States underwent 4.3 million ambulatory or inpatient procedures.¹ In 2004, children younger than 15 years of age underwent 2.3 million inpatient procedures.² One estimate suggests that 60% of these children experience significant anxiety before anesthesia induction and surgery.³

Anesthesia during the surgical procedure prevents children from recalling actual surgical events. They are, however, subjected to stressful events while preparing for surgery, such as the admission process, having blood drawn, receiving injections, or having other medications administered. Children who cling to their parents pose a challenge for perioperative nurses trying to transport them to the OR, and

the children's stress continues while they are being transported, during induction, and when they awaken before their parents arrive in the postanesthesia care unit (PACU).⁴

According to the Watson and Visram⁵ review, studies dating back 50 years have identified an association between unsatisfactory anesthetic inductions and negative personality changes. These studies led to further studies linking preoperative anxiety and postoperative behavior.⁵ Literature from around the world indicates that preoperative anxiety is a global concern.^{4,6-23} Anesthesia care providers from the United Kingdom refer to the importance of reducing children's anxiety for humanitarian reasons.⁵ Nursing researchers in Hong Kong not only deem it crucial that interventions be geared toward minimizing anxiety both in children and parents, they conclude that there still are opportunities for improvement.¹⁴

Health care team members address preoperative anxiety in children from various perspectives. The challenge that nurses face is to change traditional processes so that preoperative anxiety can be managed better in today's fast-paced ORs. To achieve this goal, preoperative anxiety should be reviewed from the perspective of various disciplines so that successful strategies can be identified and applied to typical situations and adapted to atypical ones.

To ensure use of evidence-based practice, nurses need to critically evaluate the evidence that is currently available to determine what is relevant and valuable^{24,25} to achieve the best outcomes. This article highlights a multidisciplinary approach that supports perioperative nurses caring for children and their family members during the

ABSTRACT

- **ALTHOUGH ANESTHESIA during surgery prevents children from recalling actual surgical events, they are subjected to stressful events while preparing for surgery.**
- **ONE ESTIMATE SUGGESTS that 60% of children experience significant anxiety before anesthesia induction and surgery, and literature from around the world indicates that preoperative anxiety is a global concern for health care providers.**
- **THE CHALLENGE THAT NURSES FACE is to better manage children's anxiety in today's fast-paced ORs. This article uses case studies to show nursing strategies that can be used to help allay the fears of children at different psychosocial stages of development. *AORN J* 84 (November 2006) 778-804. © AORN, Inc, 2006.**

anxiety-filled perioperative period. By providing practical application of studied techniques for use in everyday scenarios, this review can help nurses minimize preoperative distress for pediatric surgical patients.

INTERDISCIPLINARY COLLABORATION

Perioperative nurses work closely with other essential members of the OR team—surgeons; anesthesia care providers; surgical technologists; and when available, child life specialists and music therapists. A truly collaborative approach is possible when separate and specialized but related knowledge is shared between disciplines. This approach adheres to the Nurses' Code of Ethics, which states,

*Nurses should actively promote the collaborative multi-disciplinary planning required to ensure the availability and accessibility of quality health services to all persons who have needs for health care.*²⁶

THE CHILD LIFE SPECIALIST ROLE. The role of the child life specialist has become more visible in recent years. Child life specialists use preparation to help reduce anxiety in children. This health care specialist supports children and advocates for them but also can support and advocate for the parents.²⁷ For example, when a parent has concerns about being separated from his or her child and fears the risks of anesthesia, the child life specialist educates and supports him or her.

In a recent study conducted by researchers from both disciplines (ie, nurses and child life specialists), the researchers described child life specialists as professionals trained in child development who strive to “alleviate the stress and anxiety that accompany illness or hospitalization.”^{28(p16)} Overall, the study demonstrated that children

undergoing elective surgery with whom a child life specialist interacted had less postoperative anxiety than children without this support. In the discussion of clinical implications, the researchers emphasized the importance of collaboration between nurses and child life specialists.

... when children are prepared for surgery, their coping ability increases and anxiety is relieved. By understanding children's misconceptions and fears regarding surgery, child life specialists are uniquely qualified to address pediatric preparation. Child life specialists support the nursing role by addressing a child's anxiety level, which may affect compliance with nursing staff during initial admission visits, anesthesia induction, and recovery time. . . . Child life specialists also play an important role in reducing parental anxiety. Preparing families for the surgical experience not only reassures parents but also provides them with the knowledge to support their child through the surgical process. A collaborative approach between nursing and child life should improve overall patient outcomes by lessening anxiety in the day surgery pediatric patient.^{28(p21)}

ALTERNATIVE OR ADJUNCT APPROACHES. Alternative approaches, such as music therapy, may provide options for children and their family members.²⁹ “The use of music therapy interventions for pediatric surgical patients is steadily expanding in medical facilities.”^{30(p147)}

Child life specialists are professionals trained in child development who strive “to alleviate the stress and anxiety that accompany illness or hospitalization.”

Use of music preoperatively can facilitate the sedation process, can aid sleep, and can be used after surgery to lessen pain and the need for pain medication after surgery.

Use of music before surgery can include writing songs to express feelings or concerns about the procedure. Improvisation using various rhythm instruments also can provide the same opportunity for nonverbal children. Use of music preoperatively also can facilitate the sedation process, and music can be used after surgery to lessen

pain. Studies have shown that music therapy can aid sleep and lessen the need for pain medication in patients recovering from surgery.³¹⁻³⁴

A study of interactive music therapy³² highlights the effect of these individual skills on patient response. Kain et al,³² demonstrated that music therapists' skills can alter the effect that a particular music therapy has on a patient. Even if two therapists use the same techniques or therapeutic style, the effect can vary greatly between the two therapists. Overall, these researchers determined that music therapy may be helpful for the child upon separation from the parent and upon entering the OR, depending on the therapist and as the result

of significant therapist-specific effects.

A recent article described using auricular acupuncture to significantly decrease maternal anxiety during the preoperative period.³³ The lessened anxiety in the mothers benefited their children during the induction phase of anesthesia. Using computer games^{20,34} and clown doctors³⁵ (ie, health care providers, not necessarily licensed physicians, who dress as doctors in clown attire and are present during induction of anesthesia) as methods for

preoperative teaching or to facilitate coping have been studied as distraction methods for treating preoperative anxiety in children.

Each nurse is unique and has individual strengths, one of which is his or her interpersonal communication skills set. In addition to careful training in the observation of and adherence to patient-focused interventions, nurses need to be aware of how patients perceive them. Nurses can use the time during interdisciplinary collaboration to learn from their expert colleagues such as specialty- or fellowship-trained nurses, pediatric surgeons, anesthesia care providers, child life specialists, and music therapists. Nurses can emulate their colleagues' skills and receive feedback on how they are perceived by patients.

TRENDS IN ANESTHESIA CARE

Nonpharmacological management of pain and anxiety is important.

Coping with this preoperative stress requires consistent communication between the child, the parents, and all health care providers involved in the perioperative period. . . . both behavioral and pharmacological interventions can be used to address the issue of preoperative anxiety in children and their parents.^{36(p1206)}

Although anesthesia care providers use nonpharmacological interventions in their care of patients, medications are the mainstay of their practice.

DECIDING WHETHER TO PREMEDICATE. Anesthesia researchers in South Australia¹⁷ indicate that preoperative identification of children who are at high risk of excessive anxiety could more effectively target the use of pharmacological or other interventions. Using a modified version of the Yale Preoperative Anxiety Scale,¹⁷ they identified factors

associated with increased levels of anxiety in children, such as

- an increased number of people in the room at induction of anesthesia,
- a longer waiting time between admission at the hospital and induction of anesthesia,
- negative memories of previous hospital experiences, and
- having a mother who does not practice a religion.

A common-sense approach points to individual evaluation of each patient

and administration of premedication when appropriate, especially when the child's parents suggest the need to do so, because parents know their child best.³⁷ Coexisting health conditions and individualized risks must be considered in deciding on the use of anxiolytics.³⁶ A caveat for decision making is to determine if physiological alterations, such as hypoxemia, hypercapnia, low cardiac output, and resultant cerebral hypoperfusion, may be causing anxiety or agitation.³⁸

One author asserts that

if the parents are calm and can effectively manage the physical transfer to a warm and playful anesthesia care provider

or nurse, premedication is not necessary. Sedation may be awkward and recovery after premedication may be prolonged.^{39(p1220)}

Similarly, "psychological preparation may be as effective as premedication."^{17(p69)} Another review article says that

good anaesthetic practice, as well as

attention to pharmacological and physiological issues, should address the psychological aspects of the perioperative care of children.^{5(p188)}

Finally, Swedish researchers report that in their work,

42% of the children showed noncompliant behavior when given premedication. . . . although only 14% of the children were anxious or upset after premedication, the question must be raised about the benefit obtained from using midazolam as premedication.^{11(p232)}

Recommendations regarding the value of administering preoperative anxiolytics are conflicting. The practice philosophy of each anesthesia care provider regarding premedication is at least as important as patient selection criteria. Researchers from Yale University School of Medicine surveyed American anesthesia care providers in 2004 and determined that 50% of the pediatric patients they cared for were administered preoperative anxiolytics before surgery.⁴⁰ This was an increase from a previous study performed by the same researchers in 1995, which showed that 30% of children had received sedative premedication.⁴¹ The anesthesia care providers who premedicate their pediatric patients were younger in age. This may be explained by the fact that younger anesthesia care providers trained after the advent of oral midazolam may be more comfortable with the safety and efficacy of oral sedation. Before the introduction of oral midazolam, most premedications were administered intramuscularly, a major drawback with pediatric patients because of the pain of the injection itself. Although the reasons for the changes in trends in administration of preoperative anxiolytics are not known entirely, the

Health care providers should evaluate each patient and administer premedication when appropriate, especially when the child's parents suggest the need to do so.

researchers believe that increased awareness of the cause of children's and parents' preoperative anxiety have contributed to the majority of the change in practice.

ADVANTAGES OF ADMINISTERING PREOPERATIVE ANXIOLYTICS. Anxiolytic medications produce a calm state and allay anxiety and fear³⁸ while promoting hemodynamic stability but still allow patients to respond to verbal commands. Benefits include easier separation from parents, improved cooperation and manageability of pediatric patients for staff members, and avoiding a hemodynamic surge (ie, release of catecholamines manifested as increased pulse and respiratory rate) from a screaming child. Despite increased awareness and acknowledgement of preoperative anxiety, variations in practice remain. For example, according to one study, only 1.9% of anesthesia care providers who practiced at a children's hospital never premedicated their patients as compared with 25.3% of anesthesia care providers who practiced at a free-standing surgical center.⁴⁰

DISADVANTAGES OF ADMINISTERING PREOPERATIVE ANXIOLYTICS. Although Kain et al assert that "there is clear rationale for the use of preoperative interventions such as sedative premedication,"^{40(p1258)} there are drawbacks to the use of anxiolytics. Anecdotal considerations and documented concerns suggest that anxiolysis is not a be-all and end-all intervention. First and foremost, timing is critical. Medications administered orally take 15 to 30 minutes to achieve effect.^{36,39} Attempting to separate a child from his or her parents too early actually can become a dissatisfier for the parents, who find the "miracle drugs" ineffective or disconcerting. Unanticipated delays in separating the child from his or her parents can be just as frustrating because a medication like midazolam peaks and wanes after 45 to 60 minutes.³⁶ Oral premedications, which 93%

of respondents reported as the route of choice for use in pediatric patients,⁴⁰ may delay discharge to home,³⁹ particularly for short procedures like bilateral myringotomy and insertion of pneumatic equalization tubes. Delayed discharge is unfavorable for busy outpatient facilities or for families who find rapid postoperative discharge a significant satisfier. The price of the medication itself, along with the extended time in the surgical facility, can add measurable expense⁴⁰ in this era of cost-consciousness.

A separate and critical drawback to anxiolytic premedication is that the process of administering the medication (ie, IV, intramuscular, rectal, intranasal, oral) may actually increase anxiety. Pre-existing IV access rarely is available in the pediatric population, particularly those arriving for outpatient surgical procedures, although some pediatric patients may arrive for outpatient surgery with a central line in place. Intramuscular injections are painful and often considered unacceptable to already frightened children. According to one study, intramuscular injection of medications was identified by the vast majority of children queried as the most unpleasant preoperative event.⁴² Rectal administration also has drawbacks because

- psychosocially, the route of administration can be considered less than ideal, especially for older children;
- the medication can be expelled too rapidly; and
- absorption can be variable.³⁶

Intranasal administration results in, at

Anxiolytic medications produce a calm state and allay anxiety and fear while promoting hemodynamic stability but still allow patients to respond to verbal commands.

the least, a bitter, burning irritation that causes most children to cry.³⁶ Even oral medication mixed with flavored syrup can be unpalatable or poorly accepted. If a resistive child spits out the medication, a power struggle ensues and diminishes the reliability of the desired therapeutic dose or effect.

SAFETY ISSUES IN PREMEDICATION. Monitoring and safety considerations must be in place to ensure that premedicated children remain safe.^{43,44} Three of the Joint Commission on Accreditation of Healthcare Organizations' (JCAHO's) Patient Safety Goals for 2007 specific to the perioperative arena are

- goal 9—reduce the risk of patient harm resulting from falls,
- goal 13—encourage patients' active involvement in their own care as a patient safety strategy, and
- goal 13A—define and communicate the means for patients and their families to report concerns about safety and encourage them to do so.⁴⁵

Thus, nurses must inform parents of the potential for impaired coordination of a child who has been premedicated and the necessity of guarding the child against falls from a bed or while ambulating. A clinical trial using nitrous oxide

or midazolam for laceration repair procedures in children demonstrated that ataxia, dizziness, difficulty walking, and crying were much more prevalent after the procedure in the midazolam treatment group.⁴⁶ Caregivers must be vigilant, either securely holding the child or ensuring that the child remains

in the enclosed crib or bed. When transporting a pediatric patient, nurses should be alert for attempts to sit or stand and the potential for injury as a result of impaired coordination.

Anesthesia practice guidelines that serve as a reference to minimize the risks associated with medication administration highlight the benefits of sedation when it is administered by qualified providers.⁴⁷ Safety considerations warrant periodic evaluation of the patient to screen for idiosyncratic reactions and excessive sedation with respiratory depression and to reinforce to the parents that the alterations in their child's temperament, activity, and disposition are the desired effects of the medication and are not cause for alarm.

DEVELOPMENTAL FACTORS— ASSESSMENT AND INTERVENTIONS

Nurses should take a family-focused approach when helping children and their parents deal with the stress of surgery. Basic principles of caring for children and their parents apply to the perioperative period just as they apply to any health care situation involving children. Performing age-specific preoperative assessments helps nurses develop and implement individualized care plans to help children and their parents better cope with preoperative stress. Many resources are available to help nurses ensure that children and their parents receive the care necessary to minimize preoperative stress (Table 1).

TAKE A FAMILY-FOCUSED APPROACH. Often parents feel guilty and anxious about subjecting their child to even a minimally invasive surgical procedure, and their own anxiety may transfer to the child. Subsequently, the child's perception of pain may be heightened. Basic concepts, such as talking to the child in age-appropriate terms and using therapeutic play are intended to keep anxiety at a manageable level so that the ultimate

In one study, ataxia, dizziness, difficulty walking, and crying were much more prevalent postoperatively in children to whom midazolam was administered.

TABLE 1
Helpful Web Sites for Pediatric Nursing, Surgery, and Anesthesia

Web site	Web Address	Content of web site
AORN	http://www.aorn.org/patient/peds.htm	Links to various pediatric sites from the AORN web site
AORN Communities of Practice	http://communities.aorn.org/COP	Pediatric Specialty Assembly web portal (requires Pediatric Specialty Assembly membership and an AORN member user name and password login)
American Society of Anesthesiologists	http://www.asahq.org/patientEducation.htm	Includes sections on patient safety; when your child needs anesthesia; "My Trip to the Hospital Coloring Book" in printable portable document file format; and a videotape news release "Preparing Your Child for Surgery" with suggestions for effective preparation of a child for surgery and anesthesia
Society for Pediatric Anesthesia	http://www.pedsanesthesia.org/patiented/faq.iphtml	Includes explanations of pediatric anesthesiologist services, risks of anesthesia, and fasting before surgery
National Association of Pediatric Nurse Practitioners	http://www.napnap.org	Features discussion forum and clinical practice guidelines information
Child Life Council	http://www.childlife.org	Provides overviews of the association for child life professionals and other members, certification, and program services
American Academy of Pediatrics	http://www.aap.org	Provides information on a variety of children's health topics for parents and health care practitioners, including behavioral and mental health; diseases and conditions; healthy development; populations with unique health care needs; and individual topics such as breastfeeding, immunization, literacy, nutrition, and physical activity
National Dissemination Center for Children with Disabilities	http://www.nichcy.org	Provides information on disabilities in children and youths and programs and services for those children; other sections discuss educational rights, early intervention, and research
American Academy of Family Physicians	http://www.familydoctor.org	Features sections on healthy living, parents and kids, and talking to your physician; includes information in Spanish

outcome—progressing more quickly to being discharged—can be achieved.⁴⁸ Acknowledging and reassuring parental anxiety is key.

APPLY BASIC PRINCIPLES WHEN CARING FOR CHILDREN. Surgery disrupts a child's routine. Nurses should explain to the parents that anxiety and regression, such as bedwetting, is normal for a child during this

time. To minimize the fear of the unknown, nurses can provide hospital tours where children and their parents visit the OR and are allowed to see, touch, and play with OR equipment. Nurses also can provide age-appropriate toys and games or allow a child to bring his or her favorite toy or stuffed animal to the OR for reassurance.⁴⁸

BOLSTER COPING ABILITIES. Performing preoperative assessments and providing individualized care is especially important for pediatric patients. Nurses must be alert to subtle and overt signs, such as when a patient grimaces or contracts his or her body parts; or when the patient specifically asks for comfort measures. An astute nurse needs to be aware that even if these behaviors are not observed, that does not mean the patient is not in distress. Overall, the prerequisite for complete assessment is assessing each child individually.⁴⁹

In her early work, nursing professor LaMontagne⁵⁰ emphasized the importance of interview skills for accurate and complete nursing assessments. Assessment should go beyond overt behaviors because subtle signs of distress can be overlooked.

It is imperative to assess for preoperative anxiety. The complexity of preoperative fear warrants more comprehensive assessment before surgery. To find out if previous hospital experiences might have frightened or might be causing a patient's concern during this visit, the nurse must ask about those experiences. Some of the concerns affecting

this admission may be valid. During the hectic preoperative preparation period, it is easy to overlook subtle cues or statements that convey these concerns; therefore, perioperative nurses need to have highly developed interview skills. During preoperative assessments, the nurse should pay full attention to questions and assess coping strategies. Armed with this information, the nurse can then work to enhance the coping strategies the patient is using and to

suggest alternatives. By creating an environment in which patients feel free to identify and acknowledge fears that they may have tried to hide from others, nurses provide the best in perioperative care. Nurses can then help to convert the anticipated and actual stressful experience into a tolerable, and even pleasant, experience.⁵¹

The nurse should ask the child awaiting surgery what he or she knows and wants to know about the upcoming surgery.⁵⁰ This allows the nurse to clarify misunderstandings and provide additional information and suggestions on how the child can better manage fear or worry. For example, simply explaining his or her nursing functions (eg, offering medication for pain relief postoperatively) to the child may help some children effectively cope with the stressful demands of surgery and anticipated pain.⁵⁰

When asked, some children (ie, classified as vigilant copers) reveal that they like to know all the details of the surgery.⁵⁰ Other children (ie, classified as avoidant copers) may prefer less information and may benefit more from supportive discussions of the positive aspects of surgery (eg, less pain, better health).⁵⁰ Understanding which strategy a child uses to cope and determining his or her appraisal of the surgery provides the only way of knowing which intervention is most appropriate.⁵⁰ For instance, distraction can be of benefit particularly for avoidant copers. Distraction, however, requires creativity and vivacity from staff members.⁴⁹

In another study, LaMontagne et al (2003)⁵² expanded on the concept of managing preoperative anxiety when identifying the interactive effects of anxiety in both parent and child. They discovered that although significant decreases in parental anxiety occurred from the preoperative to postoperative periods, parental anxiety levels remained high, indicating that parents

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remain emotionally distressed throughout their child's recovery. Managing preoperative anxiety requires the nurse to identify the interactive effects of anxiety in both parent and child because anxiety in the parent transfers to the child. The researchers suggested directing nursing interventions according to the child's individual coping style and other interventions aimed at helping parents deal with their anxiety to help alleviate the child's anxiety and distress. This commonly used, emotion-focused approach entails positive reappraisal (ie,

pointing out the positive aspects of a situation). By presenting the positive aspects of the surgical intervention and outcomes, nurses may help parents to display a more optimistic attitude, which the child senses. Parents and children who expect positive outcomes tend to be less anxious and may be more effective in coping with their circumstances.

Seeking social support (eg, attending support groups, asking for referrals) has been shown to be the problem-focused coping strategy used most often.⁵² Nurses should continually reassess parents' need for reassurance and positive emotional support during the entire

perioperative experience. Ultimately, focusing on the benefits of surgery and urging parents to participate actively in their child's care and progress bolsters the parents' ability to cope.⁵²

Although interview techniques and skills are important, simply being available and broaching the subject of coping also is therapeutic. LaMontagne et al (1997)⁵³ emphasized that by asking par-

ents about their fears, nurses give the parents permission to focus on their own concerns. That openness in discussions encourages parents to consider their child's perceptions, thoughts, and feelings and encourages the child to express and process those emotions, thereby enhancing parental effectiveness in dealing with their child. Other sources show the dynamic interplay between patient, family, and professional.^{54,55} Health care practitioners may speed up the psychological recovery of the patient most effectively by focusing on the needs of the family unit as a whole.⁵⁴

Steelman and Wilt, in reviewing LaMontagne's previous work, reported that the findings show

the value of using theoretical frameworks to guide our practice. Research is not always available to identify best interventions to address a patient care problem. . . . It is important to develop interventions to help parents reduce preoperative anxiety. . . . Perioperative researchers should evaluate the effectiveness of the different alternatives to determine the best practice.^{56(p245)}

Brewer et al concur, stating that,

Research examining the use of anxiolytics versus preparation for alleviating pediatric anxiety would be valuable. Comparing the effectiveness of anxiolysis versus preparation would enable health care professionals to determine which type of intervention would be most beneficial.^{28(p21)}

What can the individual nurse do when such gaps in research comparisons exist? Decisions are made via clinical expertise, and ultimately are blended with "patient preferences and with available good evidence."⁵⁷ When a nurse is deciding whether the information and results apply to his or her

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patient, the nurse should have a discussion with the patient. Although successful pediatric preoperative care processes encourage health care practitioners to gear teaching to the appropriate developmental age of the child,⁵⁵ research recommendations may not be explicit or suited specifically to every child, which can lead to feelings of ineptitude or simple frustration for nurses.

One group of authors provide a practical, how-to manual in which they explain that

... the child and family have different agendas at different ages; so should the clinician. . . . This changing agenda instills a freshness into the practice of pediatrics that in our experience adds to professionalism and enjoyment.^{58(xv)} . . . each encounter [with children and families] is an opportunity for learning and growth.^{58(xvii)} . . . some of the most effective . . . teaching occurs individually with students . . . as we discuss or examine a specific patient.^{58(xv)}

INTERVENTIONS FOCUSED ON DEVELOPMENTAL STAGE

Pediatric patients can be grouped into age categories according to the age group's salient characteristics. Interventions for children and their parents can be geared to those characteristics using a team approach.⁵⁹⁻⁶¹

ALL AGES. Performing a preoperative telephone call gives a perioperative nurse the opportunity to assess a child via information obtained from the child's parents over the telephone. The nurse should gather information about the child's temperament, health, and previous OR experiences and answer all questions from the parents or child. While gathering this information, the nurse also has the opportunity to assess both the child's and parents' knowledge and anx-

ety levels. The nurse can use this information to tailor an approach to the child and parents on the day of surgery.⁴⁹ The nurse should thoroughly document the information gleaned from the preoperative interview and relay this information to other health care team members. A preoperative telephone call provides the nurse with an opportunity to instruct the parents and establish the first contact for creating relationships with the child and parents after they arrive in the preoperative setting.

After surgery, the nurse should ensure that the parents are allowed to participate in postoperative care as much as possible and coach the parents and child regarding home care needs. After assessing the parents' literacy levels, the nurse should present all postoperative instructions to the parents orally and provide them with written copies of all information. Written instructions are particularly important because the stress of the perioperative experience may make remembering oral instructions difficult. The nurse should provide the parents with a telephone number to call if questions arise and then should perform a follow-up telephone call to check on the child and parents the next day.

INFANTS/TODDLERS—BIRTH TO THREE YEARS. In this sensorimotor stage, infants display natural curiosity as they explore their environment and their own bodies. In early infancy, sources of anxiety include sudden loud noises and loss of postural support. Stranger anxiety

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develops between five months to two-and-a-half years, peaking between six and 12 months. At one year, children feel uncertain and fearful around strangers, as well as in unfamiliar situations or with unfamiliar objects. Although onset and duration vary depending on the child, separation anxiety starts around seven months, peaks between 18 and 36 months, and lasts until about four years of age.⁶² Photographs of the parents placed where the child can see them during the parents' absence may reassure children in this age group.⁶³

Toddlers believe that because they cannot see their mother, she has "gone away." A toddler, who does not quite grasp the concept of time, cannot be sure if or when his or her mother might return, which is why children in this age group cling to their mothers so fiercely.

By establishing a consistent pattern of attentive good-byes and happy reunions, [parents] can build the child's confidence in [them] and [their] relationship.⁶⁴

In addition, practicing can help a child become accustomed to separation. The nurse should encourage the parents to say good-bye the same way every time and to make a ceremony of the good-bye process. The nurse should emphasize the importance of saying good-bye lovingly but firmly, explaining in terms their child can understand when they will return (ie, at breakfast time). The nurse should encourage the parents to stick to this ceremony consis-

tently and not to give in and come back if their child begins to cry. Giving in only encourages the child to try the crying behavior the next time.⁶⁴

The nurse should explain to the parents that it is critical for the parents to come back at the time they promised. Keeping promises to children helps them learn to trust and have confidence in themselves. The nurse should explain that when parents show confidence in the caregiver to care for the child in the parents' absence, the child will pick up on these feelings and have confidence too. Furthermore, the nurse should explain to the parents that a

child's unwillingness to leave you is a good sign that healthy attachments have developed between the two of you. Eventually your child will be able to remember that you always return after you leave, and these memories will be enough to comfort him or her while you are gone. This also gives your child a chance to develop his or her own coping skills and a little independence.⁶⁴

This age encompasses the psychosocial stages of trust versus mistrust (ie, birth to 12 months) and autonomy versus shame and doubt (ie, one to three years). To provide for both physical and emotional security, the nurse should persuade the parents to be actively involved by encouraging their child and answering the child's questions. The nurse should ask the parents about the child's likes and dislikes. The nurse then can incorporate this information into the customized care plan. To reduce separation anxiety, if at all possible, the nurse should

- not separate the parents and child;
- allow the child to keep a transitional object (eg, teddy bear);
- allow parents to remain with their child during induction or at least

Nurses should emphasize the importance of parents saying good-bye lovingly but firmly and then explaining when they will return in terms their child can understand.

SIDEBAR

Parental Presence During Induction of Anesthesia

The literature shows varying viewpoints about parental presence during induction of anesthesia (PPIA). For example, in one study of anesthesia practices, 50% of US respondents reported that parents were never present during anesthesia induction of their children, 26% of hospitals did not allow parents to be present, and trends varied depending on where in the country they practiced.¹ Some reports encourage PPIA for selected children. In Australia, the practice is common;² however, other areas, while advocating parental presence, still acknowledge the need for further studies of its efficacy.³

Another report focuses on parents' desire to assist their child during induction and acknowledges the need for administrative support, through staff focus groups and inservice programs about research evidence.⁴ They predict the standard in perioperative services will become family-centered care. Ultimately, parental preparation is required to accomplish this, which the authors explain is a responsibility of nurses who have the opportunity to influence family satisfaction with PPIA.⁴ Another writer goes beyond suggestions to stronger admonishments.

Despite the concerns of some staff, we would argue that there is compelling evidence that parental exclusion from anaesthetic rooms is harmful to the child. [Barriers to PPIA] need to be challenged and realistic strategies to overcome them developed. We therefore recommend an early reappraisal of practice in children's units to ensure that parents are given a chance of accompanying their child to the anaesthetic room.^{5(p17)}

One author, however, speaks of the disadvantages or lack of adequate evidence of the efficacy of parental presence during induction, explaining that ". . . if decreasing parental anxiety is considered the outcome, parental presence during induction cannot achieve this purpose."^{6(S190)} Another author details the drawback of parental presence during induction and the need for increased preparations, saying that

Potential disadvantages of PPIA include parental anxiety resulting in possible adverse reactions of the parents. . . . Since it has not been definitively proven that PPIA decreases a child's anxiety before surgery, the question arises as to whether or not an additional risk to the child is created by allowing parents into the operating room for what might only result in increased parental satisfaction. . . . to reduce possible negative consequences, the parents must be provided with adequate preoperative education and information.^{7(p108)}

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minimize the time between separation and induction;

- not perform or administer anything painful until the child is anesthetized;
- allow parents to come into the PACU as soon as possible.

INFANT/TODDLER PATIENT EXAMPLE. Mrs W brought 16-month-old Joseph to the hospital for an outpatient repair of bilateral inguinal hernias. Mrs W wanted to be with Joey in the OR. The preoperative nurse, Nurse Q, explained that parental presence during induction was not

allowed at this hospital. Nurse Q took an instamatic photograph of mother and child, which she sent with Joey to the OR. The circulating nurse, Nurse C, reminded the mother that, as the anesthesia care provider had explained earlier, the anesthetic gases that Joey would breathe would allow him to fall asleep quickly, right after entering the OR. The next thing Joey would know, he would be waking up in the PACU, which is where she would rejoin and hold him. Nurse C distracted Joey with his favorite colorful stuffed animal as she wheeled him down the hall in his enclosed crib. Mrs W was surprised at how smoothly the separation went. The family liaison nurse, Nurse H, also updated Mrs W about progress during surgery, and Mrs W wrote on her survey questionnaire that she was satisfied and relieved by the care she and her child had received.

PRESCHOOL/EARLY CHILDHOOD—THREE TO SIX YEARS. This preoperational stage is characterized by concrete and literal thinking. In the psychosocial stage of initiative versus guilt, children become egocentric, and thus believe that they caused their own illness and that it is a form of punishment. Besides fearing needles, they fear bodily injury, mutilation, and torture.^{37,65} Still curious, their active imagination and magical thinking feeds into the fears, such as phobias of the dark and monsters.^{62,65} This is an especially important time for a nurse to forge alliances with the parents and child. By providing detailed information in clear, simple, brief language, the nurse prevents misinterpretations. Knowing that children tend to blame themselves, the nurse should reassure the child that the condition is not the child's fault. Stimulation of the senses remains important, along with therapeutic play using dolls or puppets. The nurse should convey dignity by respecting the child's privacy; for instance, the nurse should not ask the child to disrobe with the door or curtains open.⁶⁶ The nurse

should use parental input about their child's likes and dislikes, strengths and weaknesses. By encouraging questions from both the child and parents, the nurse can determine the child's perceptions and feelings. By this time, children have developed motor skills, such as for drawing, that can express their feelings in non-verbal ways.

The therapeutic relationship that a nursing student established with a three-year-old during the perioperative period was analyzed in one case study.⁸ The nursing student performed a thorough developmental assessment, provided a preoperative tour, and used therapeutic play techniques. This successfully reduced the child's fears and anxiety related to the hospitalization and surgery, ensuring that the surgical experience became a constructive encounter for the child and parents.

PRESCHOOL/EARLY CHILDHOOD PATIENT EXAMPLE. Despite Nurse R's gentle reassurances and coaxing and a firm tone, four-year-old Tanisha sat in her mother's lap, clinging to her, crying, and refusing to remove her clothing or put on the hospital gown. Mrs P was embarrassed about Tanisha's behavior and became abrupt and scolding, which only agitated Tanisha and made her cry louder. Nurse R called the anesthesia care provider who ordered midazolam. Given that Tanisha was resistive already, Nurse R used a syringe to place the medication in the back of Tanisha's mouth to encourage her to

The preschool/early childhood stage is characterized by concrete and literal thinking; children become egocentric, and thus believe that they caused their own illness and that it is a form of punishment.

swallow the “red-juice medicine” but without causing Tanisha to gag. Still screaming, Tanisha swallowed some but spit the rest out.

With the environment quieted behind closed curtains, Tanisha, still held by her mother, began to doze off after 20 minutes. She then allowed her mother to change her into a colorful pediatric hospital gown in the privacy of her room. The circulating nurse, Nurse G, and anesthesia care provider arrived with a litter with padded side rails. Nurse G introduced herself to Tanisha’s mother

and then helped her make Tanisha comfortable with warm blankets on the litter.

While they were enroute to the OR, Tanisha noticed that her mother was missing and tried to sit up, but she was too uncoordinated to do so. Nurse G helped steady her and talked quietly to Tanisha to distract her until Tanisha again closed her eyes in fatigue. At that point, Nurse G and the anesthesia care provider ensured that conversations were avoided to prevent further agitation. While Tanisha was being transferred to the OR bed, she started repeating, “I want my mommy!” and tried to sit up and jump off the OR bed. Nurse G and the anesthesia care provider

kept a calm and pleasant demeanor, using information Tanisha’s mother had provided about the family pet and an art project at preschool. Nurse G stayed with Tanisha throughout anesthesia induction by mask, which proceeded without incident.

SCHOOL-AGED/MIDDLE CHILDHOOD—SIX TO 12 YEARS. This cognitive stage is characterized by concrete operations. These children can reason both inductively and deductively and can understand cause and effect. Subsequently, they can grasp the seriousness of situations and the consequences of their actions. Although body privacy and dignity are concerns for most age groups, they are particularly so for children in the middle childhood age group;⁶⁶ and like younger children, they fear bodily injury and physical danger.⁶² One study showed that children between the ages of eight and 11 years may experience more anxiety without preparation (eg, from a child life specialist) because of their increased ability to process information.²⁸ For example, their baseline anxiety levels may be adversely affected because these children may have encountered medical situations among family members or on television and project it onto themselves.²⁸ As children mature, their increasing mental awareness can lead to increased reports of postoperative pain.

This heightened preoperative perception of pain can affect postoperative pain relief needs; therefore, the use of preoperative antianxiolytics can be critical to a pain management protocol.^{67(p713)}

To address their psychosocial stage of industry versus inferiority, nurses should encourage these children to participate actively and to show independence. For instance, the nurse should allow the child to choose a scented mask (eg, cherry, orange, bubble gum), and if he or she is not premedicated, allow the child to walk to the OR from the preoperative area accompanied by the anesthesia care provider or circulating nurse instead of being transported on a litter. The nurse should speak directly to the child rather than through his or her

*The school aged/
middle childhood
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deductively and
can understand
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Preoperative preparation of adolescents, who range from 11 to 21 years of age, is challenging because there is a vast difference in adolescent physical, cognitive, and psychological maturity.

parents. Furthermore, the nurse should inform the child about what he or she can expect during surgery (eg, duration, recovery time, return to the nursing unit); the location of the incision; and how the dressings will look. These options help

meet the child's developmental needs at this stage, such as gaining self-control and developing competence.⁶⁸ The nurse should use simple words to explain the purpose of items seen in the OR, such as the strap on the OR bed for safety and preventing accidental falls (ie, not to be used to tie children down, but to act like a seat belt in the car).⁶⁸ Distraction techniques are effective for this age group as well. The nurse should engage the child by asking open-ended questions about school activities, sports events, friends, and hobbies.⁶⁸

SCHOOL-AGED/MIDDLE CHILDHOOD PATIENT EXAMPLE. Janie, a nine-year-old patient with severe scoliosis, arrived with her parents, Mr and Mrs F for spinal surgery.

To determine if Janie was a vigilant or avoidant copier, the pediatric nurse practitioner, Nurse L, asked Janie whether she would prefer to know a lot about what was going to happen in surgery or if she would rather not know much. At first, Janie said "I guess I don't want to know very much." While Nurse L was speaking quietly with Janie's parents, Janie spontaneously asked, "If you cut me open, won't I die?" Up until this point, Janie had been calm, cooperative, and charming, not displaying any stress or fear. Nurse L answered the question directly by explaining that the purpose

of the surgery was to fix her back and everyone would take excellent care of her. Janie said, "I guess maybe I do want to know what's going to happen after all."

Nurse L calmly explained the role of the anesthesia care provider who would make sure Janie was okay while the surgeon worked on her back and then briefly explained how the surgery was performed. Janie's relief at Nurse L's reassuring response was obvious, after which Janie announced in a matter-of-fact tone, "Then I'll be okay." A simple clarification corrected her misperceptions. If she had not been asked, her fears could have gone undetected.

ADOLESCENCE. Some sources label adolescence as a period between the ages of 11 and 21 years.⁶⁹ There is a vast difference in the physical, cognitive, and psychological maturity of adolescents; therefore, preoperative preparation is challenging for nurses who care for pediatric patients in this wide age range.

Preoperative preparation of adolescents . . . will differ considerably in content and context depending on the age and developmental level of the adolescent. . . . Developmentally appropriate preparation before surgery will help perioperative nurses and surgical team members establish rapport and effectively communicate with [the patients] to reduce their anxiety and enlist their cooperation.^{69(p337)}

All of the following ages comprise the cognitive stage of formal operations, during which adolescents develop a capacity for abstract, scientific thinking. Identity versus role confusion is the hallmark challenge of this psychosocial stage.

EARLY ADOLESCENCE—10 TO 13 YEARS. Preteen children in this age group are beginning to break away from their parents, which is demonstrated by their preference for friends over family members.⁷⁰

Preteen children need to adjust as their bodies undergo rapid changes. Although preteen children start to develop abstract thought, they primarily retain concrete thinking. They can build on past learning, so the nurse should determine what the preteen patient already knows, such as what the surgeon has explained to him or her thus far. To ensure privacy, the nurse should consider talking to a preteen patient without his or her parents present but should inform the patient that the basic content covered in the teaching sessions will be relayed to the parents.⁶⁰

EARLY ADOLESCENT PATIENT EXAMPLE. Alyssa, an extremely shy and anxious 12-year-old, presented in the emergency department (ED) with her parents with symptoms of an ovarian cyst. Mr and Mrs N asked the physician about a hospital where child life specialist services would be available. The physician referred them to a surgeon who practiced at a nearby children's hospital where child life specialist services were available. This children's hospital also allowed parental presence during induction of anesthesia. The child life specialist, Ms J, met with Alyssa and her parents to discuss and reinforce the teaching about Alyssa's ovarian cyst and expected follow-up visits. During this assessment, Alyssa admitted being very anxious about having the IV started, so Ms J explained how Alyssa's hand would be numbed with topical anesthetic spray before the IV was started, and she would hardly feel the IV being inserted. Alyssa was greatly relieved and began to open up to Ms J, also admitting that she was very worried about having a big scar on her stomach that would show when she wore her bathing suit. Ms J explained that the surgeon would be making the incision just underneath her bikini/hair line and that after it healed and her pubic hair grew back, no one would be able to see it. The preoperative nurse, Nurse D, then met

with Alyssa privately to review Alyssa's gynecological history, after which Nurse D invited the parents back into the room and began to set up for starting Alyssa's IV. Alyssa explained to her parents how the IV would not hurt because of the local anesthetic, and the preoperative nurse completed the IV insertion without problems. Before leaving for the OR, Alyssa telephoned her best friend, excitedly explaining to her about the location of the incision. Alyssa's father accompanied Alyssa to the OR. The circulating nurse, Nurse Q, tucked warm blankets around Alyssa and held Alyssa's right hand while Mr N held Alyssa's left hand as Alyssa fell asleep with the anesthesia. Nurse Q then escorted Mr N to the waiting room.

Figure 1 is Alyssa's preoperative depiction of what she believed the surgery would be like. Alyssa explained that "Before my surgery, I was nervous that the IV would hurt. I also was scared that I'd have a huge, ugly scar so I could never wear a bikini bathing suit." Alyssa's primary concerns were about body image and pain management. Figure 2 is Alyssa's depiction of her actual surgical experience. Alyssa explained that

Everyone at the hospital was very nice and helpful. Having the spray on my hand before the nurse put in the IV was real cold but then I couldn't feel hardly anything when she put in the IV. It didn't hurt and I just felt her wiggling my skin around. I was nervous when we went into the OR but the nurse got me a warm

Preteen children start to develop abstract thought but primarily retain concrete thinking. They can build on past learning, so nurses should determine what preteen patients already know about the surgery.

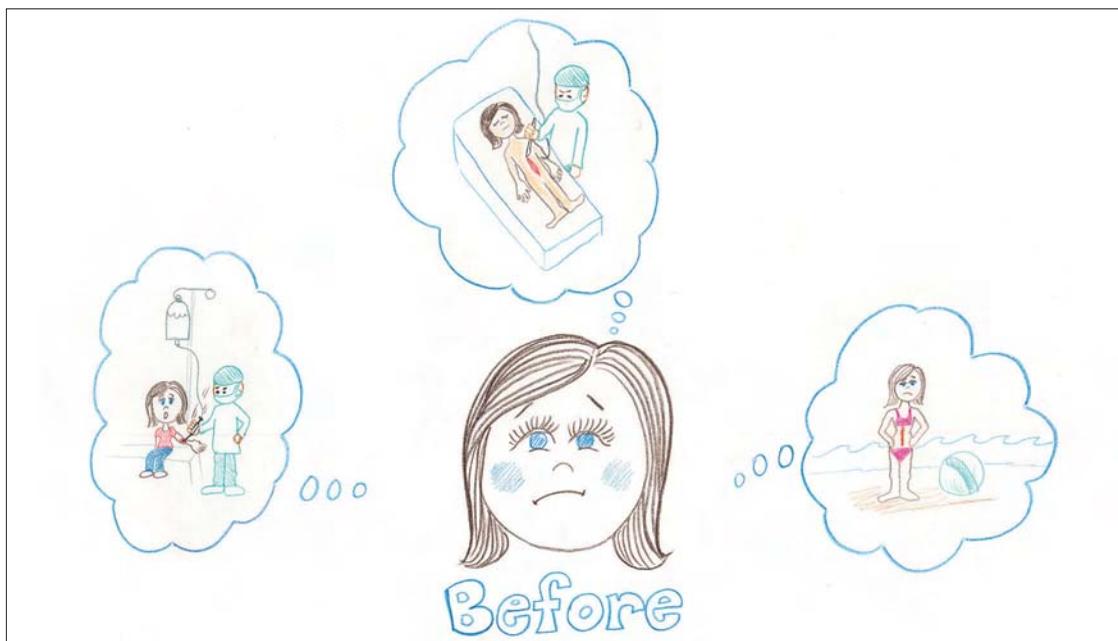


Figure 1 •
Preoperative
drawing by a
12-year-old
girl depicting
what she
thought
would
happen
during and
after surgery.
(Illustration
by Molly
Borman,
based on a
concept by
Amber
Dreger)

blanket, and she and Dad stayed with me until I went to sleep. It's only been a couple months since my surgery and you can't see my scar. I can even wear a bikini!

Although Alyssa received a local anesthetic before the IV start, she still was not pain-free, but she felt in control. Several comments show how the nurse's presence and attentiveness comforted her. The drawings and explanation emphasize the therapeutic value of the nurse's presence and the importance of the nurse's caring, friendly approach.

MIDDLE ADOLESCENCE—14 TO 16 YEARS. Still growing, teenage children are ambivalent about separation from their parents. They are in the process of testing different images and trying new styles of clothing and personal appearance in alliance with their peer group in an attempt to fit in. They are fascinated by their increasing abilities to reason and use logic, and they like to argue and debate their points. They may try to assert their independence through rebellious behaviors, albeit minor infractions. Their peer group provides support.^{60,70}

MIDDLE ADOLESCENT PATIENT EXAMPLE. Sixteen-year-old Daniel's eyelid was scratched and torn while he was playing basketball. Daniel's guardian, Aunt M,

brought him to the surgery center. The injury occurred during the summer so his two friends, Sarah and Javier, came to the surgery center with him. As the circulating nurse, Nurse V, arrived, Aunt M mentioned that the night before, Daniel had announced that he was a man and did not need anesthesia. Sarah giggled. Daniel quickly said to Nurse V, "Yes, tell the gas man not to come in here. I don't need that stuff." Nurse V asked Daniel to explain why. Daniel said, "This just isn't that big a deal. I'm not a kid. I don't need it." Nurse V explained that he, himself, was injured recently when he was playing flag football and that he was really glad to have anesthesia when the injury was repaired. Nurse V explained to Daniel that most people who have surgery use some kind of anesthesia. Daniel seemed to relax and agreed that having anesthesia might be okay.

The surgeon had met with Daniel and Aunt M earlier to discuss the details of surgery. When Nurse V asked Daniel what type of additional information he would want to know about the surgery, Daniel asked how long the surgery would take and whether it would seem that long while he was asleep. Nurse V told Daniel the anticipated surgical timeframe, allowing for extra time in case Daniel's tear duct also was



involved. Nurse V also told Daniel that, like a nap, it would seem as though he had just fallen asleep and then woken up. Daniel was content with that information and then was transferred to the OR bed and cooperated with induction.

LATE ADOLESCENCE—17 TO 21 YEARS. Increasingly independent, these young adults become more comfortable with their body image, which more closely matches their personality. They develop caring relationships, and individual relationships become more important than the entire peer group. Their abstract thinking ability is more refined and they identify steps to accomplish their goals. Their values are idealistic, and they hold rigid beliefs of right and wrong. Their self-centered values shift to attention to others.⁷⁰

LATE ADOLESCENT PATIENT EXAMPLE. At age 20, Betsy, who was on a college cheerleading squad, arrived in the ED with her coach. During practice, another girl fell from a cheerleading pyramid onto Betsy and fractured Betsy's nose. Although at 20, Betsy still is classified as a pediatric patient, legally, she can make her own decisions about health care; so the ear, nose, and throat surgeon obtained informed consent directly from Betsy. After determining that Betsy did not need general anesthesia, the surgeon ordered benzodiazepine as a premedica-

tion and a local anesthetic during the repair procedure. Nurse K helped Betsy change her upper body clothing into a hospital gown and helped Betsy get comfortable on the minor procedure room bed. After tucking Betsy in with warm blankets, Nurse K injected a local anesthetic subcutaneously into Betsy's left hand and then inserted an IV. Betsy immediately expressed her relief and gratitude that the IV insertion was so painless. With additional monitoring, Nurse K then administered the sedative according to the facility protocol, and the surgeon started the surgical repair. Nurse K remained with Betsy throughout the procedure, talking quietly with her and offering comfort while monitoring Betsy's vital signs. The surgeon completed the procedure without incident and applied an external nasal splint. During a follow-up appointment, Betsy explained to Nurse K that friends at school had teased her a lot about the external nasal splint, but Betsy was capable of understanding that in the long run her appearance and function would be restored. Betsy said that she was pleased with her overall results.

ACHIEVING BEST OUTCOMES

Several aspects of managing preoperative anxiety in children, such as use of premedications^{23,36-40,42,47} and parental

Figure 2 • Postoperative drawing by a 12-year-old girl depicting her feelings about what actually occurred during and after surgery. (Illustration by Molly Borman, based on a concept by Amber Dreger)

presence during induction,^{21,22,33,40,71} remain controversial. Despite the recent trend in increased use of sedation, it is not a panacea and has its drawbacks. Depending on the source of information regarding preoperative anxiety in pediatric patients, benefits may outweigh the drawbacks or vice versa and thus clinical judgment is required for each individual patient.

Health care practitioners' comfort level with children, their ability to employ speed, use distraction techniques, and develop rapport can be instrumental in decreasing the distress experienced by pediatric patients, whether by pharmacological, interpersonal, educational, or alternative means. Managing the typical fears and anxieties during the preoperative phase prevents escalation of this stressful period to a traumatic event.

Principles that remain constant and are supported by the literature are the value of therapeutic communication and rapport;^{12,37,72,73} importance of age-appropriate interventions tailored to the patient's developmental level;^{33-35,58-60,63} and interdisciplinary collaboration, sharing expert experiences among team members.^{28,30,32,61} Nurses can use evidence-based information to work with anesthesia colleagues, child life specialists, and music therapists to convert children's distressed anticipation of surgery to a tolerable, if not pleasant, experience. ❖

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Allergies May Be Linked to Parkinson's Disease

People who suffer from allergic rhinitis are 2.9 times more likely to develop Parkinson's disease later in life than those without allergic rhinitis, according to an Aug 7, 2006, news release from the Mayo Clinic, Rochester, Minn. Researchers theorize that the immune response that occurs in allergic rhinitis also may occur in the brain, producing inflammation. This inflammation might result in the death of brain cells, as is seen in patients with Parkinson's disease.

Previous studies have shown that people who regularly take anti-inflammatory medications are less likely to develop Parkinson's disease. Researchers

therefore investigated a possible link between Parkinson's and other common inflammatory diseases. No association was found, however, between Parkinson's disease and lupus, rheumatoid arthritis, pernicious anemia, vitiligo, or asthma. Although allergies do not cause Parkinson's disease, researchers believe there may be an association between the two.

Mayo Clinic Links Allergies to Parkinson's Disease (*news release, Rochester, Minn: Mayo Clinic, Aug 7, 2006*) <http://www.mayoclinic.org/news2006-rst/3578.html> (accessed 8 Sept 2006).

New Technique Offers Alternative to Total Hip Replacement

A new surgical technique for addressing hip pain offers patients an alternative to total hip replacement (THR), according to a May 19, 2006, news release from NewYork-Presbyterian Hospital/Columbia University Medical Center, New York. Hip resurfacing is a technique that allows the orthopedic surgeon to shave and cap several centimeters of bone within the hip joint, covering the joint's surfaces with an all-metal implant that more closely resembles a tooth cap than a hip implant.

Advantages of the hip resurfacing technique over THR include a reduced postoperative risk of

- dislocation because the implant for hip resurfacing is larger than the one that is traditionally

used in THR, resulting in increased stability,

- inaccurate leg length because the femoral head and neck are not removed and replaced as in THR, and
- resurgery to replace a worn-out plastic socket because the hip resurfacing implant is all metal.

The procedure is indicated for patients under the age of 60 who live nonsedentary lifestyles and suffer from hip pain related to diseases that affect the hip joint.

New Alternative to Hip Replacement Designed for Patients with Active Lifestyles (*news release, New York: NewYork-Presbyterian Hospital/Columbia University Medical Center, May 19, 2006*).