

The School-Age Child With a Major Illness

23

NEUROLOGIC DISORDERS

Seizure Disorders

RESPIRATORY DISORDERS

Allergic Rhinitis (Hay Fever)

Asthma

Nursing Process for the Child With Asthma

CARDIOVASCULAR DISORDERS

Rheumatic Fever

Nursing Process for the Child With Rheumatic Fever

GASTROINTESTINAL DISORDERS

Appendicitis

Nursing Process for the Child With Appendicitis

Intestinal Parasites

Enterobiasis (Pinworm Infection)

Roundworms

Hookworms

Giardiasis

ENDOCRINE DISORDERS

Type 1 Diabetes Mellitus

Nursing Process for the Child With Type 1 Diabetes Mellitus

Type 2 Diabetes Mellitus

GENITOURINARY DISORDERS

Enuresis

Encopresis

MUSCULOSKELETAL DISORDERS

Fractures

Osteomyelitis

Muscular Dystrophy

Legg-Calvé-Perthes Disease (Coxa Plana)

Osteosarcoma

Ewing's Sarcoma

Juvenile Rheumatoid Arthritis

Scoliosis

Nursing Process for the Child With Scoliosis Requiring a Brace

INTEGUMENTARY DISORDERS

Fungal Infections

Tinea Capitis (Ringworm of the Scalp)

Tinea Corporis (Ringworm of the Body)

Tinea Pedis

Tinea Cruris

Parasitic Infections

Pediculosis

Scabies

Allergic Disorders

Skin Allergies

Plant Allergies

Bites

Animal Bites

Spider Bites

Tick Bites

Snake Bites

Insect Stings or Bites

PSYCHOSOCIAL DISORDERS

Attention Deficit Hyperactivity

Disorder

School Phobia

LEARNING OBJECTIVES

On completion of this chapter, the student should be able to

1. Describe (a) simple partial motor seizures, (b) simple partial sensory seizures, and (c) complex partial (psychomotor) seizures.
2. Describe (a) tonic-clonic seizures, (b) absence seizures, (c) atonic or akinetic seizures, (d) myoclonic seizures, and (e) infantile spasms.
3. List factors that can trigger an asthma attack.
4. Describe the physiologic response that occurs in the respiratory tract during an asthma attack.
5. Name the bacterium usually responsible for the infection that leads to the development of rheumatic fever.
6. List the major manifestations of rheumatic fever.
7. List the symptoms of appendicitis, and differentiate symptoms of the older and the younger child.
8. Identify three intestinal parasites common to children and state the route of entry for each.
9. Discuss the importance of good skin care, correct insulin administration, and exercise in the diabetic child.

KEY TERMS

allergen
ankylosis
anthelmintic
arthralgia
aura
carditis
chorea
compartment syndrome
diabetic ketoacidosis
encopresis
enuresis
halo traction
hirsutism
hyposensitization

10. Identify the physiologic causes of enuresis.
11. Discuss four types of fractures seen in children.
12. Describe the purpose of doing neurovascular checks in a child with a musculoskeletal disorder.
13. List and define the five Ps to observe, record, and report when caring for a child in a cast.
14. Name the bacterium that usually causes osteomyelitis.
15. Identify the most common form of muscular dystrophy and describe its characteristics.
16. Identify the treatment for the child with osteosarcoma and Ewing's sarcoma.
17. Name the drugs of choice in the treatment of juvenile rheumatoid arthritis and state the primary purpose of these drugs.
18. Describe scoliosis and identify three methods of correction.
19. Describe the treatment for pediculosis of the scalp, and state the protection the nurse must use when treating a child with this condition in the hospital.
20. Discuss how allergens that produce a positive reaction on skin testing are commonly treated.
21. Discuss how skin allergies are commonly treated.
22. Identify 10 characteristics that may be seen in a child with attention deficit hyperactivity disorder.
23. State the cause of the symptoms seen in children with school phobia.

insulin reaction
Kussmaul breathing
kyphosis
lordosis
metaphysis
metered-dose inhaler
nebulizer
partial seizures
polyarthritis
polydipsia
polyphagia
polyuria
scoliosis
skeletal traction
skin traction
synovitis
tinea
traction
wheezing

Entering school is a stressful time for every child, but is especially so for the child with a chronic health problem. Imitation of peers is important during this time; sometimes this is impossible for the child with seizure disorders, respiratory conditions, chronic and long-term disorders, problems that limit physical mobility, and learning disorders that can make the child feel different from peers. These children must cope with all the normal developmental stresses of their age group and the additional stress that the health problem causes.

Given enough information and guidance, school-age children can learn to understand, cope with, and manage health problems such as asthma and diabetes. Nurses and caregivers who care for these children should foster maximum independence and a life as normal as possible.

NEUROLOGIC DISORDERS

Neurologic disorders can have a great impact on a child's success in school and throughout life. Continuing research can help identify the causes and improve treatment for children with seizure disorders.

Seizure Disorders

Seizure disorders, also referred to as convulsive disorders, are common in children and may result from a

variety of causes. A common form of seizures is the acute febrile seizure that occurs with fevers and acute infections. Epilepsy, on the other hand, is a recurrent and chronic seizure disorder. Epilepsy can be classified as primary (idiopathic), with no known cause, or secondary, resulting from infection, head trauma, hemorrhage, tumor, or other organic or degenerative factors. Primary epilepsy is the most common; its onset generally occurs between ages 4 and 8 years.

Clinical Manifestations

Seizures are the characteristic clinical manifestation of both types of epilepsy and may be either partial (focal) or generalized. **Partial seizures** are limited to a particular area of the brain; generalized seizures involve both hemispheres of the brain.

Partial Seizures. Manifestations of partial seizures vary depending on the area of the brain from which they arise. Loss of consciousness or awareness may not occur. Partial seizures are classified as simple partial motor, simple partial sensory, or complex partial (psychomotor).

Simple Partial Seizures. Simple partial motor seizures cause a localized motor activity such as shaking of an arm, leg, or other part of the body. These may be limited to one side of the body or may spread to other parts.

Simple partial sensory seizures may include sensory symptoms called an **aura** (a sensation that signals an impending attack) involving sight, sound, taste, smell, touch, or emotions (a feeling of fear, for

example). The child may also have numbness, tingling, paresthesia, or pain.

Complex Partial Seizures. Complex partial seizures, also called psychomotor seizures, also begin in a small area of the brain and change or alter consciousness. They cause memory loss and staring. Nonpurposeful movements, such as hand rubbing, lip smacking, arm dropping, and swallowing, may occur. After the seizure the child may sleep or may be confused for a few minutes. The child is often unaware of the seizure. These can be the most difficult seizures to control.

Generalized Seizures. Types of generalized seizures include tonic-clonic (formerly called grand mal), absence (formerly called petit mal), atonic or akinetic (formerly called “drop attacks”), myoclonic, and infantile spasms.

Tonic-Clonic Seizures. Tonic-clonic seizures consist of four stages: the prodromal period, which can last for days or hours; the aura, which is a warning immediately before the seizure; the tonic-clonic movements; and the postictal stage. Not all these stages occur with every seizure: The seizure may just begin with a sudden loss of consciousness. During the prodromal period the child might be drowsy, dizzy, or have a lack of coordination. If the seizure is preceded by an aura, it is identified as a generalized seizure secondary to a partial seizure. The aura may reflect in which part of the brain the seizure originates. Young children may have difficulty describing an aura but may cry out in response to it. In the tonic phase the child’s muscles contract, the child may fall, and the child’s extremities may stiffen. The contraction of respiratory muscles during the tonic phase may cause the child to become cyanotic and appear briefly to have respiratory arrest. The eyes roll upward, and the child might utter a guttural cry. The initial rigidity of the tonic phase changes rapidly to generalized jerking muscle movements in the clonic phase. The child may bite the tongue or lose control of bladder and bowel functions. The jerking movements gradually diminish and then disappear, and the child relaxes. The seizure can be brief, lasting less than 1 minute, or protracted, lasting 30 minutes or longer. The period after the tonic-clonic phase is called the postictal period. The child may sleep soundly for several hours during this stage or return rapidly to an alert state. Many have a period of confusion, and others experience a prolonged period of stupor.

Absence Seizures. Absence seizures rarely last longer than 20 seconds. The child loses awareness and stares straight ahead but does not fall. The child may have blinking or twitching of the mouth or an extremity along with the staring. Immediately after the seizure the child is alert and continues conversation but does not know what was said or done during the episode. Absence seizures can recur frequently, some-

times as often as 50 to 100 a day. If seizures are not fully controlled, the caregiver needs to be especially aware of dangerous situations that might occur in the child’s day, such as crossing a street on the way to school. These seizures often decrease significantly or stop entirely at adolescence.

Atonic or Akinetic Seizures. Atonic or akinetic seizures cause a sudden momentary loss of consciousness, muscle tone, and postural control and can cause the child to fall. They can result in serious facial, head, or shoulder injuries. They may recur frequently, particularly in the morning. After the seizure the child can stand and walk as normal.

Myoclonic Seizures. Myoclonic seizures are characterized by a sudden jerking of a muscle or group of muscles, often in the arms or legs without loss of consciousness. Myoclonus occurs during the early stages of falling asleep in people who do not have epilepsy.

Infantile Spasms. Infantile spasms occur between 3 and 12 months of age, almost always indicate a cerebral defect, and have a poor prognosis despite treatment. These seizures occur twice as often in boys as in girls and are preceded or followed by a cry. Muscle contractions are sudden, brief, symmetrical, and accompanied by rolling eyes. Loss of consciousness does not always occur.

Status Epilepticus. Status epilepticus is the term used to describe a seizure that lasts longer than 30 minutes or a series of seizures in which the child does not return to his or her previous normal level of consciousness. Immediate treatment decreases the likelihood of permanent brain injury, respiratory failure, or even death.

This advice could be a life-saver. Status epilepticus is an emergency situation and requires immediate treatment.



Diagnosis

The types of seizures can be differentiated through the use of electroencephalography (EEG), video and ambulatory EEG, skull radiography, computed tomography (CT), magnetic resonance imaging (MRI), brain scan, and physical and neurologic assessments. The child’s seizure history is an important part of determining the diagnosis.

Treatment

The main goal of treatment, complete control of seizures, can be achieved for most people through the use of anticonvulsant drug therapy. A number of anticonvulsant drugs are available (Table 23–1). The drug is chosen based on its effectiveness in controlling seizures and side effects and on its degree

TABLE 23.1 Antiepileptic-Anticonvulsive Therapeutic Agents

Drug	Indication	Side Effects	Nursing Implications
Carbamazepine (Tegretol)	Generalized tonic-clonic, simple partial, complex partial	Drowsiness, dry mouth, vomiting, double vision, leukopenia, GI upset, thrombocytopenia	There may be dizziness and drowsiness with initial doses. This should subside within 3–14 days.
Clonazepam (Klonopin)	Absence seizures, generalized tonic-clonic, myoclonic, simple partial, complex partial	Double vision, drowsiness, increased salivation, changes in behavior, bone marrow depression	Obtain periodic liver function tests and complete blood count. Monitor for drowsiness, lethargy.
Ethosuximide (Zarontin)	Absence seizures, myoclonic	Dry mouth, anorexia, dizziness, headache, nausea, vomiting, GI upset, lethargy, bone marrow depression	Use with caution in hepatic or renal disease.
Phenobarbital (Luminol)	Generalized tonic-clonic, myoclonic, simple partial, complex partial	Drowsiness, alteration in sleep patterns, irritability, respiratory and cardiac depression, restlessness, headache	Alcohol can enhance the effects of phenobarbital. Monitor blood levels of drug. Liver function studies are necessary with prolonged use.
Phenytoin (Dilantin)	Generalized tonic-clonic, simple partial, complex partial	Double vision, blurred vision, slurred speech, nystagmus, ataxia, gingival hyperplasia, hirsutism, cardiac arrhythmias, bone marrow depression	Alcohol, antacids, and folic acid decrease the effect of phenytoin. Instruct the child or caregiver to notify the dentist that he or she is taking phenytoin to monitor hyperplasia of the gums. Inform the child or caregiver that the drug may color the urine pink to red-brown.
Primidone (Mysoline)	Generalized tonic-clonic, simple partial, complex partial	Behavior changes, drowsiness, hyperactivity, ataxia, bone marrow depression	Adverse effects are the same as for phenobarbital. Sedation and dizziness may be severe during initial therapy; dosage may need to be adjusted by the physician.
Valproic acid (Depakene)	Absence, generalized tonic-clonic, myoclonic, simple partial, complex partial	Nausea, vomiting, or increased appetite, tremors, elevated liver enzymes, constipation, headaches, depression, lymphocytosis, leukopenia, increased prothrombin time	Physical dependency may result when used for prolonged period. Tablets and capsules should be taken whole. Elixir should be taken alone, not mixed with carbonated beverages. Increased toxicity may occur with administration of salicylates (aspirin).

General Nursing Considerations With Anticonvulsant Therapy

General nursing considerations with anticonvulsant therapy that apply to all or most of drugs given to children include:

1. Warn the patient and family that patients should avoid activities that require alertness and complex psychomotor coordination (e.g., climbing).
2. Medication can be given with meals to minimize gastric irritation.
3. The anticonvulsant medications should not be discontinued abruptly as this can precipitate status epilepticus.
4. Anticonvulsant medications generally have a cumulative effect, both therapeutically and adversely.
5. Alcohol ingestion increases the effects of anticonvulsant drugs, exaggerating central nervous system depression.
6. Many of the drugs can cause bone marrow depression (leukopenia, thrombocytopenia, neutropenia, megaloblastic anemia). Regular complete blood cell counts, including WBCs, RBCs, and platelets, are necessary to evaluate bone marrow production.
7. The child should receive periodic blood tests to monitor therapeutic levels as opposed to toxic levels.

Here's a pharmacology fact.

Be aware that the drug phenytoin (Dilantin) can cause hypertrophy of the gums (gingival hyperplasia) after prolonged use. Encourage good oral hygiene and frequent dental checkups

of toxicity. Chewable or tablet forms of the medications are often used because suspensions separate and sometimes are not shaken well, causing the possibility of inaccurate dosage. The oldest and most popular drug is phenytoin (Dilantin).

A few children may be candidates for surgical intervention when the focal point of the seizures is in an area of the brain that is accessible surgically and not critical to functioning. If the cause of the seizures is a tumor or other lesion, surgical removal is sometimes possible.

Ketogenic diets (high in fat and low in carbohydrates and protein) cause the child to have high levels of ketones, which help to reduce seizure activity. These diets are prescribed, but long-term maintenance is difficult because the diets are difficult to follow and may be unappealing to the child.

Nursing Care

In the hospital or home setting, keeping the child safe during a seizure is the highest priority. The caregiver of a child who has a seizure disorder needs to be taught how to prevent injury if the child has a seizure (see Family Teaching Tips: Precautions Before and During Seizures). In the hospital setting the side rails are padded, objects that could cause harm are kept away from the bed, oxygen and suction are kept at the bedside, and the side rails are in the raised position and the bed lowered when the child is sleeping or resting.

If the child begins to have a seizure, the child is placed on her or his side with the head turned toward one side. The nurse stays calm and removes any objects from around the child, protects the child's head, and loosens tight clothing. During the seizure, the nurse notes

- Time the seizure started
- What the child was doing when the seizure began
- Any factor present just before the seizure (bright light, noise)
- Part of the body where seizure activity began
- Movement and parts of the body involved
- Any cyanosis
- Eye position and movement
- Incontinence of urine or stool
- Time seizure ended
- Child's activity after the seizure

FAMILY TEACHING TIPS**Precautions Before and During Seizures****BEFORE**

- Have child swim with a companion.
- Have child use protective helmet and padding for bicycle riding, skateboarding.
- Supervise when using power equipment.
- Carry or wear medical ID bracelet.
- Discuss the child's condition with teachers and school nurse.
- Know factors that trigger seizure activity.

DURING

- Stay calm.
- Move furniture or objects that could cause injury.
- Turn child on side with head turned to one side.
- Remove glasses.
- Protect child's head.
- Don't restrain.
- Don't try to put anything between child's teeth.
- Keep people from crowding around child.
- After seizure, notify care provider for follow-up.
- If seizures continue without stopping, call for emergency help.

Be sure to ask. The child may be able to describe the aura or sensation that occurred just before a seizure.



functions, and behavior. The nurse documents the information noted during the seizure activity. If the child is able to describe the aura, this information is important to document.

Education and counseling of the child and the family caregivers are important parts of nursing care. They need complete and accurate information about the disorder and the results that can be realistically expected from treatment. Epilepsy does not lead inevitably to mental retardation, but continued and uncontrolled seizures do increase its possibility. Thus early diagnosis and control of seizures are very important.

Although the outlook for a normal, well-adjusted life is favorable, the nurse should inform the child and family about restrictions that may be encountered. Children with epilepsy should be encouraged to participate in physical activities but should not participate in sports in which a fall could cause serious

When the seizure ends the nurse should monitor the child, closely paying attention to his or her level of consciousness, motor

6 UNIT 5 ● Care of the Child

injury. In many states a person with uncontrolled epilepsy is legally forbidden to drive a motor vehicle; this could limit choice of vocation and lifestyle. Despite attempts to educate the general public about epilepsy, many people remain prejudiced about this disorder, and this can limit the epileptic person's social and vocational acceptance.

TEST YOURSELF

- What are seven types of seizures seen in children?
- What 10 factors should the nurse document after a seizure?

RESPIRATORY DISORDERS

Respiratory disorders such as allergic rhinitis and asthma can be chronic in nature and require long-term care and treatment. The school-age child needs support to maintain normal activities that promote growth and development.

Allergic Rhinitis (Hay Fever)

Allergic rhinitis in children is most often caused by sensitization to animal dander, house dust, pollens, and molds. Pollen allergy seldom appears before 4 or 5 years of age.

Clinical Manifestations

A watery nasal discharge, postnasal drip, sneezing, and allergic conjunctivitis are the usual symptoms of allergic rhinitis. Continued sniffing, itching of the nose and palate, and the "allergic salute," in which the child pushes his or her nose upward and backward to relieve itching and open the air passages in the nose, are common complaints. Because of congestion in the nose, there is back pressure to the blood circulation around the eyes, and dark circles are visible under the eyes (Fig. 23-1). Headaches are common in older children.

Treatment and Nursing Care

When possible, offending allergens are avoided or removed from the environment. Antihistamine-decongestant preparations, such as Dimetapp, Actifed, and others can be helpful for some patients. Hypo-sensitization can be implemented, particularly if antihistamines are not helpful or are needed chronically. Parents should be taught the importance of avoiding



● **Figure 23.1** Back pressure to blood circulation around the eyes leads to dark areas under the eyes in the child with allergic rhinitis.

allergens and administering antihistamines to decrease symptoms.

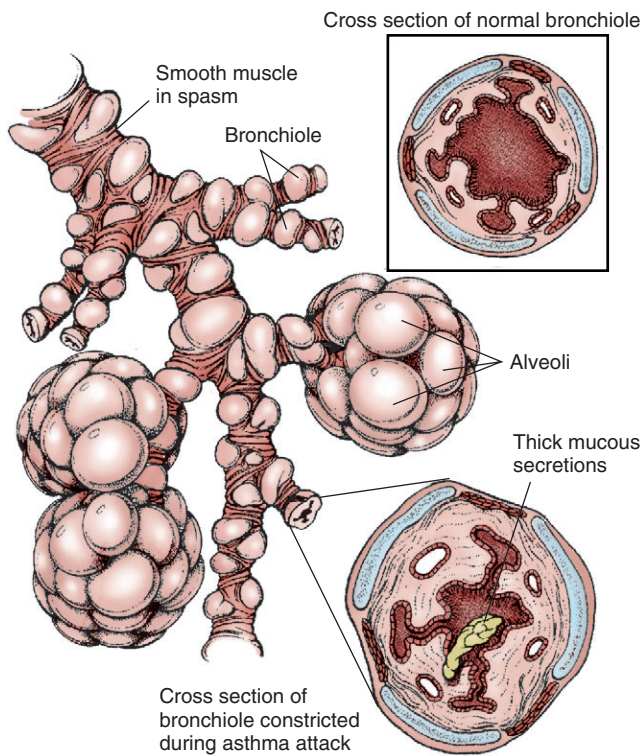
Asthma

Asthma is a spasm of the bronchial tubes caused by hypersensitivity of the airways in the bronchial system and inflammation that leads to mucosal edema and mucous hypersecretion. Asthma is also sometimes referred to as reactive airway disease. This reversible obstructive airway disease affects millions of people in the United States, including 5% to 10% of all U.S. children.

Asthma attacks are often triggered by a hypersensitive response to allergens. In young children asthma may be a response to certain foods. Asthma is often triggered by exercise, exposure to cold weather, and irritants such as wood-burning stoves, cigarette smoke, dust, and pet dander and foods such as chocolate, milk, eggs, nuts, and grains. Infections, such as bronchitis and upper respiratory infection, can provoke asthma attacks. In children with asthmatic tendencies, emotional stress or anxiety can trigger an attack. Some children with asthma may have no evidence of an immunologic cause for the symptoms.

Asthma can be either intermittent, with extended periods when the child has no symptoms and does not need medication, or chronic, with the need for frequent or continuous therapy. Chronic asthma affects the child's school performance and general activities and may contribute to poor self-confidence and dependency. Asthma accounts for one third of the missed school days in the United States (Eggleston, 2006).

Spasms of the smooth muscles cause the lumina of the bronchi and bronchioles to narrow. Edema of the



● **Figure 23.2** Bronchiole airflow obstruction in asthma.

mucous membranes lining these bronchial branches and increased production of thick mucus within them combine with the spasm to cause respiratory obstruction (Fig. 23–2).

Clinical Manifestations

The onset of an attack can be very abrupt or can progress over several days, as evidenced by a dry hacking cough, **wheezing** (the sound of expired air being pushed through obstructed bronchioles), and difficulty breathing. Asthma attacks often occur at night and awaken the child from sleep. The child must sit up and is totally preoccupied with efforts to breathe. Attacks might last for only a short time or might continue for several days. Thick, tenacious mucus might be coughed up or vomited after a coughing episode. In some asthmatic patients, coughing is the major symptom, and wheezing occurs rarely if at all. Many children no longer have symptoms after puberty, but this is not predictable. Other allergies may develop in adulthood.

Diagnosis

The history and physical examination are of primary importance in diagnosing asthma. When observing the child's breathing, dyspnea and labored breathing may be noted, especially on expiration. When listening to the child's lung sounds (auscultation), the examiner

hears wheezing, which is often generalized over all lung fields. Mucus production may be profuse. Pulmonary function tests are valuable diagnostic tools and indicate the amount of obstruction in the bronchial airways, especially in the smallest airways of the lungs. A definitive diagnosis of asthma is made when the obstruction in the airways is reversed with bronchodilators.

Treatment

Children and their families must be taught to recognize the symptoms that lead to an acute attack so they can be treated as early as possible. These symptoms include respiratory retractions and wheezing and an

Did you know? Prevention is the most important aspect in the treatment of asthma.



increased amount of coughing at night, in the early morning, or with activity. Use of a peak flow meter is an objective way to measure airway obstruction, and children as young as 4 or 5 years of age can be taught to use one (see Family Teaching Tips: How to Use a Peak Flow Meter and Fig. 23–3). A peak flow diary should be maintained and also can include symptoms, exacerbations, actions taken, and outcomes. Families must make every effort to eliminate any possible allergens from the home.

The goals of asthma treatment include preventing symptoms, maintaining near-normal lung function and activity levels, preventing recurring exacerbations and hospitalizations, and providing the best medication treatment with the fewest adverse effects. Depending on the frequency and severity of symptoms and exacerbations, a stepwise approach to the treatment of asthma is used to manage the disease.



● **Figure 23.3** The child with asthma uses a peak flow meter and keeps track of readings on a daily basis.

FAMILY TEACHING TIPS

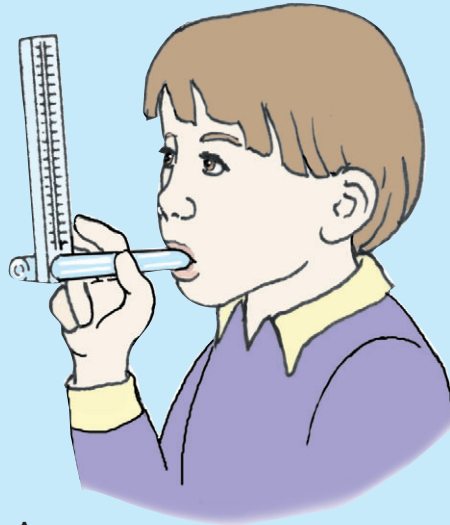


How to Use a Peak Flow Meter

INTRODUCTION

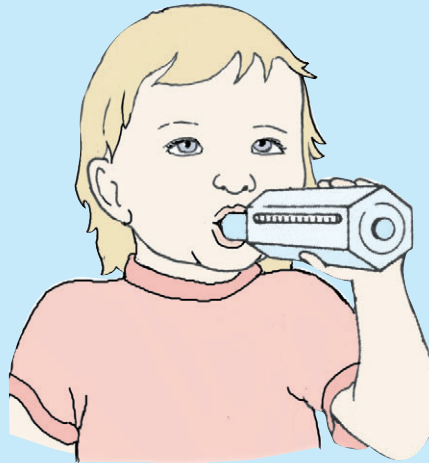
Your child cannot feel early changes in the airway. By the time the child feels tightness in the chest or starts to wheeze, he or she is already far into an asthma episode. The most reliable early sign of an

asthma episode is a drop in the child's peak expiratory flow rate, or the ability to breathe out quickly, which can be measured by a peak flow meter. Almost every asthmatic child over the age of 4 years can and should learn to use a peak flow meter (Figs. A and B.)



(A) The Assess peak flow meter. (B) The Mini-Wright peak flow meter.

A



B

Steps to Accurate Measurements

1. Remove gum or food from the mouth.
2. Move the pointer on the meter to zero.
3. Stand up and hold the meter horizontally with fingers away from the vent holes and marker.
4. With mouth wide open, slowly breathe in as much air as possible.
5. Put the mouthpiece on the tongue and place lips around it.
6. Blow out as hard and fast as you can. Give a short, sharp blast, not a slow blow. The meter measures the fastest puff, not the longest.
7. Repeat steps 1–6 three times. Wait at least 10 seconds between puffs. Move the pointer to zero after each puff.
8. Record the best reading.

Guidelines for Treatment

Each child has a unique pattern of asthma episodes. Most episodes begin gradually, and a drop in peak flow can alert you to start medications before the actual symptoms appear. This early treatment can prevent a flare-up from getting out of hand. One way to look at peak flow scores is to match the scores with three colors:

<p>Green 80%–100% personal best No symptoms Full breathing reserve Mild trigger may not cause symptoms Continue current management</p>	<p>Yellow 50%–80% personal best Mild to moderate symptoms Diminished reserve A minor trigger produces noticeable symptoms Augment present treatment regimen</p>	<p>Red Below 50% personal best Serious distress Pulmonary function is significantly impaired Any trigger may lead to severe distress Contact care provider</p>
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Remember, treatment should be adjusted to fit the individual's needs. Your physician will develop a home management plan with you. When in doubt, consult your care provider.

TABLE 23.2 Stepwise Approach to Treating Asthma	
Steps	Symptoms
<p>Step One Mild intermittent</p>	<p>Symptoms occur less than 2 times a week No symptoms between exacerbations Exacerbations brief Nighttime symptoms less than 2 times a month</p>
<p>Step Two Mild persistent</p>	<p>Symptoms occur more than 2 times a week but less than 1 time a day Exacerbations may affect activity Nighttime symptoms greater than 2 times a month</p>
<p>Step Three Moderate persistent</p>	<p>Daily symptoms Daily use of inhaled short-acting beta-2 agonist Exacerbations affect activity Exacerbations more than 2 times a week, may last days Nighttime symptoms more than 1 time a week</p>
<p>Step Four Severe persistent</p>	<p>Continual symptoms Limited physical activity Frequent exacerbations Frequent nighttime symptoms</p>

The steps are used to determine combinations of medications to be used (Table 23–2).

Medications used to treat asthma are divided into two categories: quick-relief medications for immediate treatment of symptoms and exacerbations and long-term control medications to achieve and maintain control of the symptoms. The classifications of drugs used to treat asthma include bronchodilators (sympathomimetics and xanthine derivatives) and other antiasthmatic drugs (corticosteroids, leukotriene inhibitors, and mast cell stabilizers). Table 23–3 lists some of the medications used to treat asthma. Many of these drugs can be given either by a **nebulizer**

(tube attached to a wall unit or cylinder that delivers moist air via a face mask) or a **metered-dose inhaler** ([MDI]; a hand-held plastic device that delivers a premeasured dose). The MDI may have a spacer unit attached that makes it easier for the young child to use (Fig. 23–4).

Bronchodilators. Bronchodilators are used for quick relief of acute exacerbations of asthma symptoms. They are short acting and available in pill, liquid, or inhalant form. These drugs are administered every 6 to 8 hours or every 4 to 6 hours by inhalation if breathing difficulty continues. In severe attacks, epinephrine by subcutaneous injection often



● **Figure 23.4** (A) Girl using a nebulizer with a mask. (B) Boy using a metered-dose inhaler with spacer.

TABLE 23.3 Medications Used in the Treatment of Asthma				
Generic Name	Trade Name	Dose Form	Uses	Adverse Reactions/Side Effects
Bronchodilators				
Sympathomimetics (Beta-2-receptor Agonists)				
albuterol sulfate	Proventil, Ventolin	MDI PO Nebulizer	Quick relief	Restlessness, anxiety, fear, palpitations, insomnia, tremors
metaproterenol hydrochloride	Alupent, Metaprel	MDI PO Nebulizer	Quick relief Short-term control	Tremors, anxiety, insomnia, dizziness, tachycardia
terbutaline sulfate	Brethine	MDI PO	MDI—Quick relief PO—Long-term control	Tremors, anxiety, insomnia, dizziness, tachycardia
salmeterol	Serevent	MDI	Long-term control	Headache, tremors, tachycardia
Xanthine Derivative				
Theophylline	Slo-Phyllin, Elixophyllin Theo-Dur	PO Timed-release	Long-term control	Nausea, vomiting, headache, nervousness, irritability, insomnia
Antiasthma Drugs				
Corticosteroids				
beclomethasone	Beclovent	MDI	Long-term control	Throat irritation, cough, nausea, dizziness
triamcinolone	Azamacort	MDI	Long-term control	Throat irritation, cough, nausea, dizziness
Leukotriene Inhibitors				
Montelukast	Singulair	PO	Long-term control	Headache, nausea, abdominal pain, diarrhea
Mast Cell Stabilizers				
Cromolyn	Intal	Intranasal nebulizer	Long-term control	Nasal irritation, unpleasant taste, headache, nausea, dry throat

MDI = metered-dose inhaler

affords quick relief of symptoms. Some bronchodilators such as salmeterol (Serevent) are used in long-term control.

Theophylline preparations have long been used in the treatment of asthma. The drug is available in short-acting and long-acting forms. The short-acting forms are given about every 6 hours. Because they enter the bloodstream quickly, they are most effective when used only as needed for intermittent episodes of asthma. Long-acting preparations of theophylline are given every 8 to 12 hours. Some of these preparations come in sustained-release forms. These are helpful in patients who continually need medication because these drugs sustain more consistent theophylline levels in the blood than do short-acting forms. Patients hospitalized for status asthmaticus may receive theophylline intravenously.

Corticosteroids. Corticosteroids are anti-inflammatory drugs used to control severe or chronic cases of asthma. Steroids may be given in inhaled form to

decrease the systemic effects that accompany oral steroid administration.

Leukotriene Inhibitors. Leukotriene inhibitors are given by mouth along with other asthma medications for long-term control and prevention of mild, persistent asthma. Leukotrienes are bronchoconstrictive substances that are released in the body during the inflammatory process. These drugs inhibit leukotriene production, which helps with bronchodilation and decreases airway edema.

Mast Cell Stabilizers. Mast cell stabilizers help to stabilize the cell membrane by preventing mast cells from releasing the chemical mediators that cause bronchospasm and mucous membrane inflammation. They are used to help decrease wheezing and exercise-induced asthma attacks. These are nonsteroidal anti-inflammatory drugs (NSAIDs) and have relatively few side effects. A bronchodilator often is given to open up the airways just before the mast cell stabilizer is used. Children dislike the taste of the medication, but receive

ing sips of water after the administration minimizes the distaste.

Chest Physiotherapy

Because asthma has multiple causes, treatment and continued management of the disease require more than medication. Chest physiotherapy includes

Check out this tip.



For the asthmatic child, if exercises can be taught as part of play activities, children are more likely to find them fun and to practice them more often.

breathing exercises, physical training, and inhalation therapy. Studies have shown that breathing exercises to improve respiratory function and to control asthma attacks can be an important adjunct to using

medications for treatment. These exercises teach children how to help control their own symptoms and thereby build self-confidence, which is sometimes lacking in asthmatic children.

● Nursing Process for the Child With Asthma

ASSESSMENT

Obtain information from the caregiver about the asthma history, the medications the child takes, and the medications taken within the last 24 hours. Ask whether the child has vomited, because vomiting would prevent absorption of oral medications. Ask about any history of respiratory infections; possible allergens in the household, such as pets; type of furniture and toys; if there is a damp basement (which could contain mold spores); and a history of breathing problems after exercise.

In the physical exam, include vital signs, observation for diaphoresis and cyanosis, position, type of breathing, alertness, chest movement, intercostal retractions, and breath sounds. Note any wheezing.

If the child is old enough and alert enough to cooperate, involve him or her in gathering the history, and encourage the child to add information. Ask questions that can be answered “yes” or “no” to minimize tiring the distressed child.

SELECTED NURSING DIAGNOSES

- Ineffective Airway Clearance related to bronchospasm and increased pulmonary secretions

- Risk for Deficient Fluid Volume related to water loss from tachypnea and diaphoresis and reduced oral intake
- Fatigue related to dyspnea
- Anxiety related to sudden attacks of breathlessness
- Deficient Knowledge of the caregiver related to disease process, treatment, home care, and control of disease

OUTCOME IDENTIFICATION AND PLANNING

The initial major goals for the child include maintaining a clear airway and an adequate fluid intake and relieving fatigue and anxiety. The family’s goals include learning how to manage the child’s life with asthma. Base the nursing plan of care on these goals.

IMPLEMENTATION

Monitoring Respiratory Function

Continuously monitor the child while he or she is in acute distress from an asthma attack using pulse oximetry and an electronic monitor. If this equipment is unavailable, take the child’s respirations every 15 minutes during an acute attack and every 1 or 2 hours after the crisis is over. Listening to lung sounds should be done to further monitor the respiratory function. Observe for nasal flaring and chest retractions; observe the skin for color and diaphoresis.

Elevate the child’s head. An older child may be more comfortable resting forward on a pillow placed on an over-bed table. Monitor the child for response to medications and their side effects, such as restlessness, gastrointestinal upset, and seizures. Use humidified oxygen and suction as needed during periods of acute distress.

Monitoring and Improving Fluid Intake

During an acute attack the child may lose a great quantity of fluid through the respiratory tract and may have a poor oral intake because of coughing and vomiting. Theophylline administration also has a diuretic effect, which compounds the problem. Monitor intake and output. Encourage oral fluids that the child likes. Intravenous (IV) fluids are administered as ordered. IV fluid intake is monitored, and all precautions for parenteral administration are followed. Note the skin turgor and observe the mucous membranes at least every 8 hours. Weigh the child daily to help determine fluid losses.

Promoting Energy Conservation

The child might become extremely tired from the exertion of trying to breathe. Activities and patient care should be spaced to provide maximum periods of uninterrupted rest. Provide quiet activities when the

12 UNIT 5 ● Care of the Child

child needs diversion. Keep visitors to a minimum, and maintain a quiet environment.

Reducing Child and Parent Anxiety

The sudden onset of an asthma attack can be frightening to the child and the family caregivers. Respond quickly when the child has an attack. Reassure the child and the family during an episode of dyspnea.

Teach the child and the caregiver the symptoms of an impending attack and the immediate response needed to decrease the threat of an attack. This knowledge will help them to cope with impending attacks and plan how to handle the attacks. When they are prepared with information, the child and family may be less fearful. Give the child examples of sports figures, entertainers, actors and actresses, and political

Nursing judgment is in order.



The asthmatic child's fear of attacks can be increased by the caregiver's behavior.

leaders who have or have had asthma, for example, Olympic track and field athlete Jackie Joyner Kersee and President John F. Kennedy. Others include Jerome Bettis, professional football player; Amy Van Dyken, American swimming champion; Nancy Hogshead, Olympic gold medalist in swimming; Dennis Rodman, NBA basketball player; and Diane Keaton, actress.

Providing Family Teaching

Child and family caregiver teaching is of primary importance in the care of asthmatic children. Family caregivers might overprotect the child because of the fear that an attack will occur when the child is with a baby-sitter, at school, or anywhere away from the caregiver. Asthma attacks can be prevented or decreased by prompt and adequate intervention. Teach the caregiver and child, within the scope of the child's ability to understand, about the disease process, recognition of symptoms of an impending attack, environmental control, infection avoidance, exercise, drug therapy, and chest physiotherapy.

Teach the caregiver and the child how to use metered-dose inhaler medications and have them demonstrate correct usage (see Family Teaching Tips: How to Use a Metered-Dose Inhaler). Give instructions on home use of a peak flow meter. Urge them to maintain a diary to record the peak flow as well as asthma symptoms, onset of attacks, action taken, and results. Include instructions about administering premedication before the child is exposed to situations in which an attack may occur.

Inform caregivers of allergens that may be in the child's environment and encourage them to eliminate or control the allergens as needed. Stress the impor-

FAMILY TEACHING TIPS



How to Use a Metered-Dose Inhaler

- When ready to use, shake the inhaler well with the cap still on. The child should stand, if possible.
- Remove the cap.
- Hold the inhaler with the mouthpiece down, facing the child.
- Be sure the child's mouth is empty.
- Hold the mouthpiece about 1 to 1½ inches from the lips.*
- Breathe out normally. Open mouth wide and begin to breathe in.
- Press top of medication canister firmly while inhaling deeply. Hold breath as long as possible (at least 10 seconds—teach child to count slowly to 10).
- Breathe out *slowly* through nose or pursed lips.
- Relax 2 to 5 minutes repeat as directed by physician.

*The mouthpiece can also be put between the lips, with the lips forming an airtight seal, or a spacer can be attached to the inhaler and the mouthpiece held between the lips.

tance of quick response when the child has a respiratory infection. Give instructions for exercise and chest physiotherapy.

Stress to the caregivers the importance of informing the child's classroom teacher, physical education teacher, school nurse, baby-sitter, and others who are responsible for the child about the child's condition. With a physician's order, including directions for use, the child should be permitted to bring medications to school and keep them so they can be used when needed.

Provide information on support groups available in the area. The American Lung Association has many materials available to families and can provide information about support groups, camps, and workshops (website: <http://www.lungusa.org>). The Asthma and Allergy Foundation of America (website: <http://www.aafa.org>) and the National Heart, Lung, and Blood Institute (website: <http://www.nhlbi.nih.gov>) are also resources.

EVALUATION: GOALS AND EXPECTED OUTCOMES

- **Goal:** The child's airway will remain open.
Expected Outcomes: The child's breath sounds are clear with no wheezing, retractions, or nasal flaring; the skin color is good.

- **Goal:** The child's fluid intake will be adequate.
Expected Outcomes: The child's hourly urine output is 30 to 40 mL; mucous membranes are moist; skin turgor is good; weight remains stable.
- **Goal:** The child will have increased energy levels.
Expected Outcomes: The child participates in age-appropriate activities after period of rest; activities are well-spaced.
- **Goal:** The child's and caregivers' anxiety and fear related to impending attacks will be minimized.
Expected Outcomes: The child and the caregiver list the symptoms of an impending attack, describe appropriate responses, and display confidence in their ability to handle an attack.
- **Goal:** The child and the caregiver will gain knowledge of how to live with asthma.
Expected Outcomes: The child and the caregiver verbalize an understanding of the disease process, treatment, and control. They interact with health care personnel and ask and answer relevant questions. The caregiver obtains information and makes contact with support groups.

TEST YOURSELF

- What is the most important aspect in the treatment of asthma?
- What are the two categories of medications used in the treatment of asthma?
- What are the routes of administration for many of the medications used to treat asthma?
- Why is chest physiotherapy used in the treatment of asthma?

CARDIOVASCULAR DISORDERS

The child's cardiovascular system experiences a period of slow growth with few problems through the school-age years. The primary threat to the cardiovascular system during this age is rheumatic heart disease as a complication of rheumatic fever.

Rheumatic Fever

Rheumatic fever is a chronic disease of childhood, affecting the connective tissue of the heart, joints, lungs, and brain. An autoimmune reaction to group A beta-hemolytic streptococcal infections, rheumatic fever occurs throughout the world, particularly in the temperate zones. It has become less common in devel-

oped countries, but there have been recent indications of increased occurrences in some areas of the United States.

Rheumatic fever is precipitated by a streptococcal infection, such as strep throat, tonsillitis, scarlet fever, or pharyngitis, which may be undiagnosed or untreated. The resultant rheumatic fever manifestation may be the first indication of trouble. However, an elevation of antistreptococcal antibodies that indicates recent streptococcal infection can be demonstrated in about 95% of the rheumatic fever patients tested within the first 2 months of onset. An antistreptolysin-O titer, or ASO titer, measures these antibodies.

Clinical Manifestations

A latent period of 1 to 5 weeks follows the initial infection. The onset is often slow and subtle. The child may be listless, anorectic, and pale. He or she may lose weight and complain of vague muscle, joint, or abdominal pains. Often there is a low-grade late afternoon fever. None of these is diagnostic by itself, but if such signs persist the child should have a medical examination.

Major manifestations of rheumatic fever are **carditis** (inflammation of the heart), **polyarthritis** (migratory arthritis), and **chorea** (disorder characterized by emotional instability, purposeless movements, and muscular weakness). The onset may be acute, rather than insidious, with severe carditis or arthritis as the presenting symptom. Chorea generally has an insidious onset.

Carditis. Carditis is the major cause of permanent heart damage and disability among children with rheumatic fever. Carditis may occur alone or as a complication of either arthritis or chorea. Presenting symptoms may be vague enough to be missed. The child may have a poor appetite, pallor, a low-grade fever, listlessness, or moderate anemia. Careful observation may reveal slight dyspnea on exertion. Physical examination shows a soft systolic murmur over the apex of the heart. Unfortunately, such a child may have been in poor physical health for some time before the murmur is discovered.

Acute carditis may be the presenting symptom, particularly in young children. An abrupt onset of high fever (perhaps as high as 104°F [40°C]), tachycardia, pallor, poor pulse quality, and a rapid decrease in hemoglobin are characteristic. Weakness, prostration, cyanosis, and intense precordial pain are common. Cardiac dilation usually occurs. The pericardium, myocardium, or endocardium may be affected.

Polyarthritis. Polyarthritis moves from one major joint to another (ankles, knees, hips, wrists, elbows, shoulders). The joint becomes painful to either touch or movement (**arthralgia**) and hot and swollen. Body

14 UNIT 5 ● Care of the Child

temperature is moderately elevated; the erythrocyte sedimentation rate (ESR) is increased. Although extremely painful, this type of arthritis does not lead to the disabling deformities that occur in rheumatoid arthritis.

Chorea. The onset of chorea is gradual, with increasing incoordination, facial grimaces, and repetitive involuntary movements. Movements may be mild and remain so, or they may become increasingly severe. Active arthritis is rarely present when chorea is the major manifestation. Carditis occurs, although less commonly than when polyarthritis is the major condition. Attacks tend to be recurrent and prolonged but are rare after puberty. It is seldom possible to demonstrate an increase in the antistreptococcal antibody level because of the generally prolonged latency period.

Diagnosis

Rheumatic fever is difficult to diagnose and sometimes impossible to differentiate from other diseases. The possible serious effects of the disease demand early and conscientious medical treatment. However, avoid causing apprehension and disruption of the child's life because the condition could prove to be something less serious. The nurse should not attempt a diagnosis but should understand the criteria on which a presumptive diagnosis is based.

The modified Jones criteria (Fig. 23-5) are generally accepted as a useful rule for guidance when deciding whether or not to treat the patient for rheumatic fever. The criteria are divided into major and minor categories. The presence of two major or one major and two minor criteria indicates a high probability of rheumatic fever if supported by evidence of a preceding streptococcal infection. This system is not infallible, however, because no one criterion is specific to the disease; additional manifestations can help confirm the diagnosis.

Treatment

The chief concern in caring for a child with rheumatic fever is the prevention of residual heart disease.

This could make a difference.

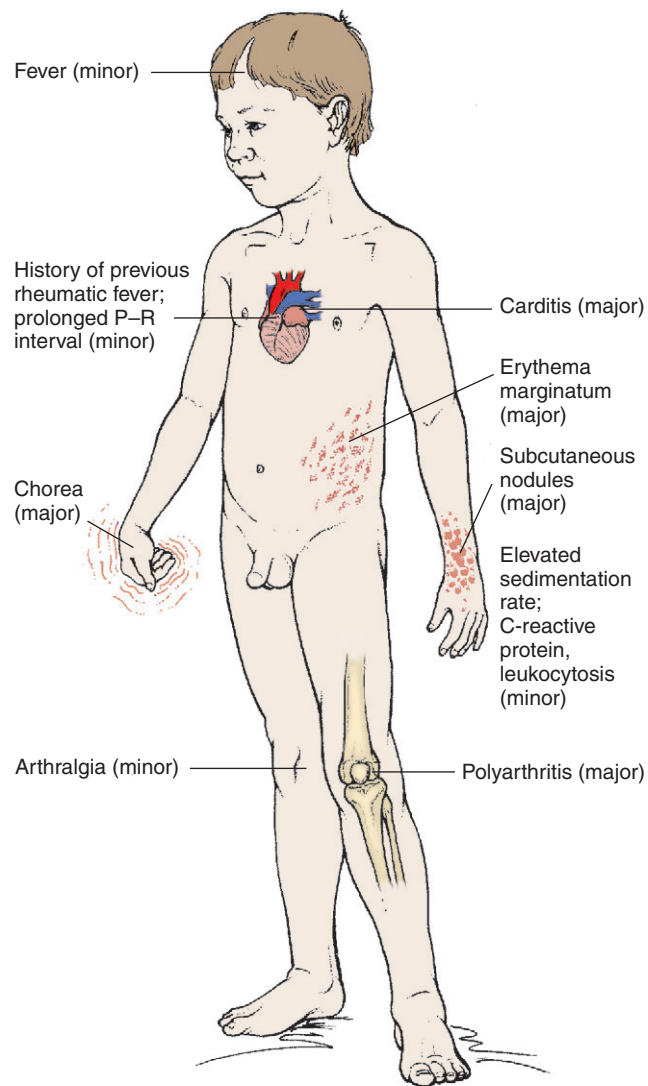


As long as the rheumatic process is active, progressive heart damage is possible, so bed rest is essential for the child with rheumatic fever to reduce the heart's workload.

accordance with its severity and its type with digitalis,

Bed rest is ordered, and the length of bed rest is determined by the degree of carditis present. This may be from 2 weeks to several weeks, depending on how long heart failure is present.

Residual heart disease is treated in



● **Figure 23.5** Major and minor manifestations of rheumatic fever.

restricted activities, diuretics, and a low-sodium diet as indicated.

Laboratory tests, although nonspecific, provide an evaluation of the disease activity to guide treatment. Two commonly used indicators are the ESR and the presence of C-reactive protein. The ESR is elevated in the presence of an inflammatory process and is nearly always increased in the polyarthritis or carditis manifestation of rheumatic fever. It remains elevated until clinical manifestations have ceased and any subclinical activity has subsided. It seldom increases in uncomplicated chorea. Therefore ESR elevation in a choreic patient may indicate cardiac involvement.

C-reactive protein in the body indicates an inflammatory process is occurring. It appears in the serum of acutely ill people, including people ill with rheumatic fever. As the patient improves, C-reactive protein decreases or disappears.

Leukocytosis is also an indication of an inflammatory process. Until the leukocyte count returns to a normal level, the disease probably is still active.

Medications used in the treatment of rheumatic

Here's a pharmacology fact.



the child feels well.

The nurse needs to stress that the child must take the complete prescription of penicillin (usually 10 days' supply), even though the symptoms disappear and the

fever include penicillin, salicylates, and corticosteroids. Penicillin is administered to eliminate the hemolytic streptococci. If the child is allergic to penicillin, erythromycin is used. Penicillin administration continues after the acute phase of the illness

to prevent the recurrence of rheumatic fever.

Salicylates are given in the form of acetylsalicylic acid (aspirin) to children, with the daily dosage calculated according to the child's weight. Aspirin relieves pain and reduces the inflammation of polyarthritis. It is also used for its antipyretic effect. The continued administration of a relatively large dosage may cause toxic effects; individual tolerance differs greatly.

For mild or severe carditis, corticosteroids appear to be the drug of choice because of their prompt and dramatic action.

Administration of salicylates or corticosteroids is not expected to alter the course of the disease, but the control of the toxic manifestations enhances the child's comfort and sense of well-being and helps reduce the burden on the heart. This is of particular importance in acute carditis with congestive heart failure. Diuretics may be administered when needed in severe carditis.

Corticosteroids and salicylates are of little value in the treatment of uncomplicated chorea. The child may be sedated with phenobarbital, chlorpromazine (Thorazine), haloperidol (Haldol), or diazepam (Valium). Bed rest is necessary, with protection such as padding of the sides of the bed if the movements are severe.

Prevention

Because the peak of onset of rheumatic fever occurs in school-age children, health services for this age group take on added importance. The overall approach is to promote continuous health supervision for all children, including the school-age child. The use of well-child conferences or clinics needs to increase to provide continuity of care for children. The nurse who has contact in any way with school-age children must be aware of the importance of teaching the public about the need to have upper respiratory infections evaluated for group A beta-hemolytic streptococcus and the need for treatment with penicillin.

TEST YOURSELF

- What type of infection would likely be found in the history of a child who has rheumatic fever?
- Explain the terms carditis, polyarthritis, and chorea.
- What are two important aspects in the prevention of rheumatic fever?

• Nursing Process for the Child With Rheumatic Fever

ASSESSMENT

Conduct a thorough exam of the child. Begin with a careful review of all systems, and note the child's physical condition. Observe for any signs that may be classified as major or minor manifestations. In the physical exam, observe for elevated temperature and pulse and carefully examine for erythema marginatum, subcutaneous nodules, swollen or painful joints, or signs of chorea. A throat culture determines whether there is an active infection. Obtain a complete up-to-date history from the child and the caregiver. Ask about a recent sore throat or upper respiratory infection. Find out when the symptoms began, the extent of the illness, and what if any treatment was obtained. Include the school-age child in the nursing interview to help contribute to the history.

SELECTED NURSING DIAGNOSES

- Acute Pain related to joint pain when extremities are touched or moved
- Deficient Diversional Activity related to prescribed bed rest
- Activity Intolerance related to carditis or arthralgia
- Risk for Injury related to chorea
- Risk for Noncompliance with prophylactic drug therapy related to financial or emotional burden of lifelong therapy
- Deficient Knowledge of caregiver related to the condition, need for long-term therapy, and risk factors

OUTCOME IDENTIFICATION AND PLANNING

The goals are determined in cooperation with the child and the caregiver. Goals for the child include reducing

pain, providing diversional activities and sensory stimulation, conserving energy, and preventing injury. Goals for the caregiver include complying with drug therapy and increasing knowledge about the long-term care of the child. Throughout planning and implementation, bear in mind the child's developmental stage.

IMPLEMENTATION

Providing Comfort Measures and Reducing Pain

Position the child to relieve joint pain. Large joints, including the knees, ankles, wrists, and elbows, usually are involved. Carefully handle the joints when moving the child to help minimize pain. Warm baths and gentle range-of-motion exercises help to alleviate some

Watch out. Even the weight of blankets may cause pain for the child with rheumatic fever. Be alert to this possibility and improvise covering as needed.



of joint discomfort. Use pain indicator scales with children so they are able to express the level of their pain (see Fig. 4-8, Chap. 4).

Salicylates are administered in the form of aspirin to

reduce fever and relieve joint inflammation and pain. Because of the risks of long-term administration of salicylates, note any signs of toxicity and record and report them promptly. Administer aspirin after meals or with a glass of milk to lessen gastrointestinal irritation. Enteric-coated aspirin is also available for patients

Here's a pharmacology fact.



Tinnitus, nausea, vomiting, and headache are all important signs of toxicity when administering aspirin. Observe closely and report any of these symptoms.

who are sensitive to the effects of aspirin. Large doses may alter the prothrombin time and thus interfere with the clotting mechanism. Salicylate therapy is usually continued until all laboratory findings are normal.

The child whose pain is not controlled with salicylates may be administered corticosteroids. Side effects such as **hirsutism** (abnormal hair growth) and "moon face" may be upsetting to the child and family. Toxic reactions such as euphoria, insomnia, gastric irritation, and growth suppression must be watched for and reported. Because premature withdrawal of a steroid drug is likely to cause a relapse, it is important to discontinue use of the drug gradually by decreasing dosages.

Providing Diversional Activities and Sensory Stimulation

Children vary greatly in how ill they feel during the acute phase of rheumatic fever. For those who do not feel very ill, bed rest can cause distress or resentment. Be creative in finding diversional activities that allow bed rest but prevent restlessness and boredom. This may be a good time to choose a book that involves the child's imagination and that has enough excitement to create ongoing interest. Do not use the television as an all-day baby-sitter. Quiet games can provide some entertainment. Use of a computer can be beneficial, because both entertaining and educational games are available and most children enjoy working with a computer. Simple needlework and model building are other useful diversional activities. During the school year make efforts (or encourage the caregiver) to provide the child with a tutor and work from school; this helps relieve boredom and also maintains contact with peers. Plan all activities with the child's developmental stage in mind. The pain of arthralgia may be so great that the child will not want to be involved in any kind of activity. Administer analgesics as ordered to help decrease the inflammation of the joints and decrease the pain, so the child will want to participate in age-appropriate activities.

Promoting Energy Conservation

Provide rest periods between activities to help pace the child's energies and provide for maximum comfort. During times of increased cardiac involvement or exacerbations of joint pain, the child may want to rest and perhaps have someone read a story. Peers may be encouraged to visit, but these visits must be monitored so that the child is not overly tired. The child's classmates could be encouraged to write to the child to provide contact with everyday school activities and keep the child in touch. If the child has chorea, inform visitors that the child cannot control these movements, which are as upsetting to the child as they are to others.

Preventing Injury

The child with chorea may be frustrated with his or her inability to control the movements. Provide an opportunity for the child to express feelings. Protect the child from injury by keeping the side rails up and padding them. Do not leave a child with chorea unattended in a wheelchair. Use all appropriate safety measures.

Promoting Compliance With Drug Therapy

A child does not become immune from future attacks of rheumatic fever after the first illness. Rheumatic fever can recur whenever the child has a group A beta-

hemolytic streptococcal infection if the child is not properly treated. For this reason, the child who has had rheumatic fever must be maintained on prophylactic doses of penicillin for 5 years or longer. Whenever the child is to have oral surgery, including dental work, extra prophylactic precautions should be taken, even in adulthood. Because of this long-term therapy, noncompliance for both financial and emotional reasons can become a problem. Oral penicillin is usually prescribed, but if compliance is poor, monthly injections of Bicillin can be substituted. Encourage the family to contact the local chapter of the American Heart Association (website: <http://www.americanheart.org>) for help finding economical sources of penicillin. Become informed about other resources that may be available in your community. Emphasize to the child and the family the need to prevent recurrence of the disease because of the danger of heart damage. Follow-up care must be ongoing, even into adulthood.

Providing Family Teaching

Inform the family and child about the importance of having all upper respiratory infections checked by a health care provider to prevent another episode of a streptococcal infection. Be certain that they understand the child can have recurrences and that a future recurrence could have much more serious effects. If the child has had carditis and heart damage has occurred, instruct the caregiver that the child must receive regular follow-up evaluations of the damage. The child may need to be maintained on cardiac medications. Instruct the family about these medications. Mitral valve dysfunction is a common aftereffect of severe carditis. A girl who has had mitral valve damage from cardiac involvement may have problems in adulthood during pregnancy. Inform the caregiver that heart failure for such a girl is a possibility during pregnancy and that she should be monitored closely to determine heart problems in the event that a mitral valve replacement is needed.

Teaching time is an excellent opportunity to stress the importance of preventing rheumatic fever. Other children in the family may benefit if caregivers are given this information.

EVALUATION: GOALS AND EXPECTED OUTCOMES

- **Goal:** The child's joint pain will be minimal.
Expected Outcome: The child verbalizes or indicates, by using a pain scale to express degree of pain, that the pain level is decreased.
- **Goal:** The child will become engaged in activities while on bed rest.

Expected Outcome: The child displays interest and is actively involved in age-appropriate activities.

- **Goal:** The child will learn when and how to conserve energy.
Expected Outcomes: The child rests quietly during rest periods, identifies when he or she needs rest, and engages in quiet diversional activities.
- **Goal:** The child will remain free of injury from chorea movements and a safe environment is maintained.
Expected Outcomes: The child has no evidence of injury; safety measures are followed.
- **Goal:** The family caregivers will comply with follow-up drug therapy, and the child will take prophylactic medications.
Expected Outcome: The child and family caregivers verbalize an understanding of the importance of prophylactic medication and identify means for obtaining it.
- **Goal:** The family caregivers will verbalize an understanding of the child's condition, need for long-term therapy, and risk factors.
Expected Outcomes: The caregivers discuss the child's condition and need for follow-up care for the child and indicate how they will obtain it.

GASTROINTESTINAL DISORDERS

The school-age child may have periodic complaints about a stomach ache or abdominal pain. Usually, these aches and pains are minor, benign, and self-limiting. However, the child's complaints should not be dismissed without being assessed, especially if they seem to be acute, have a regular pattern, or are accompanied by other symptoms.

Appendicitis

Appendicitis refers to an inflammation of the appendix. The appendix is a blind pouch located in the cecum near the ileocecal junction. Obstruction of the lumen of the appendix is the primary cause of appendicitis. The obstruction usually is caused by hardened fecal matter or a foreign body. This obstruction causes circulation to be slowed or interrupted, resulting in pain and necrosis of the appendix. The necrotic area can rupture, causing escape of fecal matter and bacteria into the peritoneal cavity and resulting in the

complication of peritonitis. Most cases of appendicitis in childhood occur in the school-age child.

Clinical Manifestations

In young children the symptoms may be difficult to evaluate. Symptoms in the older child may be the same as in an adult: pain and tenderness in the right lower quadrant of the abdomen, nausea and vomiting, fever, and constipation. However, these symptoms are uncommon in young children; many children already have a ruptured appendix when first

Do you know the why of it?



When appendicitis is suspected, laxatives and enemas are contraindicated because they increase peristalsis, which increases the possibility of rupturing an inflamed appendix.

seen by the physician. The young child has difficulty localizing the pain, may act restless and irritable, and may have a slight fever, a flushed face, and a rapid pulse. Usually, the white blood cell count is slightly elevated. It may

take several hours to rule out other conditions and make a positive diagnosis.

Treatment

Surgical removal of the appendix is necessary and should be performed as soon as possible after diagnosis. If the appendix has not ruptured before surgery, the operative risk is nearly negligible. Even after perforation has occurred, the mortality rate is less than 1%.

Food and fluids by mouth are withheld before surgery. If the child is dehydrated, IV fluids are ordered. If fever is present, the temperature should be reduced to below 102°F (38.9°C).

Recovery is rapid and usually uneventful. The child is ambulated early and can leave the hospital a few days after surgery. If peritonitis or a localized abscess occurs, gastric suction, parenteral fluids, and antibiotics may be ordered.

• Nursing Process for the Child With Appendicitis

ASSESSMENT

When a child is admitted with a diagnosis of possible appendicitis, an emergency situation exists. The family caregiver who brings the child to the hospital often is upset and anxious. The admission examination and assessment must be performed quickly and skillfully. Obtain information about the child's condi-

tion for the last several days to formulate a picture of how the condition has developed. Emphasize gastrointestinal complaints, appetite, bowel movements for the last few days, and general activity level. During the physical exam include vital signs, especially noting any elevation of temperature, presence of bowel sounds, abdominal guarding, and nausea or vomiting. Report immediately diminished or absent bowel sounds. Provide the child and caregiver with careful explanations about all procedures to be performed. Use special empathy and understanding to alleviate the child's and family's anxieties.

SELECTED NURSING DIAGNOSES

- Fear of the child and family caregiver related to emergency surgery
- Acute Pain related to necrosis of appendix and surgical procedure
- Risk for Deficient Fluid Volume related to decreased intake
- Deficient Knowledge of caregiver related to postoperative and home care needs

OUTCOME IDENTIFICATION AND PLANNING

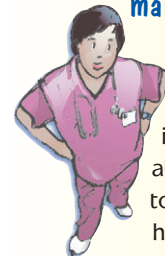
Because of the urgent nature of the child's admission and preparation for surgery, great efforts must be taken to provide calm reassuring care to both the child and the caregivers. A major goal for both the child and the caregivers is relieving fear. Additional goals for the child are relieving pain and maintaining fluid balance. Another goal for the family is increasing knowledge of the postoperative and home care needs of the child.

IMPLEMENTATION

Reducing Fear

Although procedures must be performed quickly, consider both the child's and the family's fear. The child may be extremely frightened by the sudden change of events and also may be in considerable pain. The family caregiver may be apprehensive about impending surgery.

What a difference this can make.



Before the child goes to surgery, if possible, demonstrate deep breathing, coughing, and abdominal splinting to the child and have her or him practice it.

Introduce various health care team members by name and title as they come into the child's room to perform procedures. Explain to the child and the family what is happening and why. Ex-

plain the postanesthesia care unit (recovery room) to the child and the family. Encourage the family and child to verbalize fears and try to allay these fears as much as possible. Let family members know where to wait during surgery, how long the surgery will last, where dining facilities are located, and where the surgeon will expect to find them after surgery. Throughout the preoperative care, be sensitive to verbalized or nonverbalized fears and provide understanding care.

Promoting Comfort

Analgesics are not given before surgery because they may conceal signs of tenderness that are important for diagnosis. Provide comfort through positioning and gentle care while performing preoperative procedures. Heat to the abdomen is contraindicated because of the danger of rupture of the appendix. After surgery, observe the child hourly for indications of pain and administer analgesics as ordered. Provide quiet activities to help divert the child's attention from the pain. The child may fear postoperative ambulation because of pain. Many children (and adults, too) are worried that the stitches will pull out. Reassure the child that this worry is understood but that the sutures (or staples) are intended to withstand the strain of walking and moving. Activity is essential to the child's recovery but should be as pain free as possible. Help the child understand that as activity increases, the pain will decrease. The child whose appendix ruptured before surgery may also have pain related to the nasogastric tube, abdominal distention, or constipation.

Monitoring Fluid Balance

Dehydration can be a concern, especially if the child has had preoperative nausea and vomiting. On admission to the hospital, the child is maintained NPO until after surgery. Accurately measure and record intake and output. IV fluids are administered as ordered. After surgery, check dressings to detect evidence of excessive drainage or bleeding that indicates loss of fluids. Clear oral fluids are usually ordered soon after surgery. After the child takes and retains fluids successfully, a progressive diet is ordered. Monitor, record, and report bowel sounds at least every 4 hours because the physician may use this as a gauge to determine when the child can have solid food.

Providing Family Teaching

The child who has had an uncomplicated appendectomy usually convalesces quickly and can return to school within 1 or 2 weeks. Teach the caregiver to keep the incision clean and dry. Activities are limited according to the physician's recommendations. The child whose appendix ruptured may be hospitalized for as long as a week and is more limited

in activities after surgery. Instruct the family to observe for signs and symptoms of postoperative complications, including fever, abdominal distention, and pain. Emphasize the need for making and keeping follow-up appointments.

EVALUATION: GOALS AND EXPECTED OUTCOMES

- **Goal:** The child and family caregivers will have reduced or alleviated fear.
Expected Outcomes: The child and family verbalize fears and ask questions before surgery; the child cooperates with health care personnel.
- **Goal:** The child's pain will be controlled.
Expected Outcome: The child's pain is at an acceptable level, as evidenced by the child's verbalization of pain according to a pain scale.
- **Goal:** The child will have adequate fluid intake.
Expected Outcomes: The child's skin turgor is good, vital signs are within normal limits, and hourly urine output is at least 30 to 40 mL.
- **Goal:** The family caregivers will verbalize an understanding of postoperative and home care needs of the child.
Expected Outcomes: The family caregivers discuss recovery expectations, demonstrate wound care as needed, and list signs and symptoms to report.

Intestinal Parasites

A few intestinal parasites are common in the United States, especially in young and school-age children. Hand-to-mouth practices contribute to infestations.

ENTEROBIASIS (PINWORM INFECTION)

The pinworm (*Enterobius vermicularis*) is a white threadlike worm that invades the cecum and may enter the appendix. Articles contaminated with pinworm eggs spread pinworms from person to person. The infestation is common in children and occurs when a child unknowingly swallows the pinworm eggs. The eggs hatch in the intestinal tract and grow to maturity in the cecum. The female worm, when ready to lay her eggs, crawls out of the anus and lays the eggs on the perineum.

Itching around the anus causes the child to scratch and trap new eggs under the fingernails, which often causes reinfection when the child's fingers go into the mouth. Clothing, bedding, food, toilet seats, and other articles become infected, and the infestation spreads to other members of the family. Pinworm eggs also can float in the air and be inhaled.

20 UNIT 5 ● Care of the Child

The life cycle of these worms is 6 to 8 weeks, after which reinfestation commonly occurs without treatment. The incidence is highest in school-age children and next highest in preschoolers. All members of the family are susceptible.

Clinical Manifestations and Diagnosis

Intense perianal itching is the primary symptom of pinworms. Young children who cannot clearly verbalize their feelings may be restless, sleep poorly, or have episodes of bed-wetting.

The usual method of diagnosis is to use cellophane tape to capture the eggs from around the anus and to examine them under a microscope. Adult worms also may be seen as they emerge from the anus when the child is lying quietly or sleeping. The cellophane tape test for identifying worms is performed in the early morning, just before or as soon as the child awakens. The test is performed in the following manner:

1. Wind clear cellophane tape around the end of a tongue blade, sticky side outward.
2. Spread the child's buttocks and press the tape against the anus, rolling the tape from side to side.
3. Transfer the tape to a microscope slide and cover with a clean slide to send to the laboratory. If the caregiver does not have slides or a commercially prepared kit, the caregiver should place the tongue blade in a plastic bag and bring it to the health care facility.

The tape then is examined microscopically for eggs in the laboratory.

Treatment and Nursing Care

Treatment consists of the use of an **anthelmintic** (or vermifugal, a medication that expels intestinal worms). Mebendazole (Vermox) is the most commonly used product. The medication should be repeated in 2 or 3 weeks to eliminate any parasites that hatch after the initial treatment. Because pinworms are easily transmitted, the nurse should encourage all family members to be treated.

It is often disturbing to children and caregivers for the child to be found to have pinworms. They may need reassurance from the nurse that pinworm infestation is as common as an infection or a cold. This support is important when caring for a child with any type of intestinal parasite.

As a preventive measure the nurse should teach the child to wash the hands after bowel movements and before eating. The child should also be encouraged to observe other hygiene measures, such as regular bathing and daily change of underclothing. The

nurse must teach caregivers to keep the child's fingernails short and clean. Caregivers also need to know that bedding should be changed frequently to avoid reinfestation. All bedding and clothing, especially underclothing, should be washed in hot water.

ROUNDWORMS

Ascaris lumbricoides is a large intestinal worm found only in humans. Infestation occurs through contact with the feces of people with infestation. It is usually found in areas where sanitary facilities are lacking and human excreta are deposited on the ground.

The adult worm is pink and 9 to 12 inches long. The eggs hatch in the intestinal tract, and the larvae migrate to the liver and lungs. The larvae reaching the lungs ascend up through the bronchi, are swallowed, and reach the intestine, where they grow to maturity and mate. Eggs are then discharged into the feces. Full development requires about 2 months. In tropical countries where infestation may be heavy, bowel obstructions may present serious problems.

Generally, no symptoms are present in ordinary infestations. Identification is made by means of microscopic examination of feces for eggs. Pyrantel pamoate (Antiminth) is the medication commonly used. Caregivers require education about improved hygiene practices, with sanitary disposal of feces, including diapers as necessary to prevent infestation.

HOOKWORMS

The hookworm lives in the human intestinal tract, where it attaches itself to the wall of the small intestine. Eggs are discharged in the feces of the host. These parasites are prevalent in areas where infected human excreta are deposited on the ground and where the soil, moisture, and temperature are favorable for the development of infective larvae of the worm. In the southeastern United States and tropical West Africa, the prevailing species is *Necator americanus*.

Clinical Manifestations and Diagnosis

After feces containing eggs are deposited on the ground, larvae hatch. They can survive there as long as 6 weeks and usually penetrate the skin of barefoot people. They produce an itching dermatitis on the feet (ground itch). The larvae pass through the bloodstream to the lungs and into the pharynx, where they are swallowed and reach the small intestine. In the small intestine they attach themselves to the intestinal wall, where they feed on blood. Heavy infestation may cause anemia through loss of blood. Chronic infestation produces listlessness, fatigue, and malnutrition. Identification is made by examination of the stool under the microscope.

Treatment and Nursing Care

Pyrantel pamoate or mebendazole may be used in the treatment of hookworms. The nurse must stress the need for the affected child to receive a well-balanced diet with additional protein and iron. Transfusions are rarely necessary. To prevent hookworm infestation, the nurse should instruct caregivers to keep children from running barefoot where there is any possibility of ground contamination with feces.

GIARDIASIS

Giardiasis is not caused by a worm but by the protozoan parasite *Giardia lamblia*. It is a common cause of diarrhea in world travelers and is also prevalent in children who attend day care centers and other types of residential facilities; it may be found in contaminated mountain streams or pools frequented by diapered infants. The child ingests the cyst containing the protozoa. The cyst is activated by stomach acid and passes into the duodenum, where it matures and causes signs and symptoms.

Clinical Manifestations and Treatment

Maturation of the cyst leads to diarrhea, weight loss, and abdominal cramps. Identification and diagnosis are made through examination of stool under the microscope. Metronidazole (Flagyl) or quinacrine (Atabrine) is effective in treating the infestation.

Nursing Care

The nurse should alert the caregiver that quinacrine causes a yellow discoloration of the skin. To prevent infestations, the nurse should stress to caregivers the importance of careful handling of soiled diapers, especially in a childcare facility. Handwashing, avoiding pools and streams used by diapered infants, and avoiding contact with infected persons are also important.

TEST YOURSELF

- What is the appendix and where is it located?
- What is contraindicated if a diagnosis of appendicitis is suspected?
- What are common ways pinworm infections are spread?

ENDOCRINE DISORDERS

Diabetes mellitus is classified into two major types: type 1, formerly called insulin-dependent diabetes

mellitus (IDDM) or juvenile diabetes, and type 2, formerly called non-insulin-dependent diabetes mellitus (Table 23–4). Type 1 diabetes mellitus is the most significant endocrine disorder that affects children. However, in recent years type 2 diabetes mellitus, previously seen primarily in adults, has been seen more commonly in children.

Other endocrine conditions that may affect children are disorders of the pituitary gland, which alter growth, and diabetes insipidus. The incidence of these latter conditions is low.

Type 1 Diabetes Mellitus

At least 15 million Americans have been diagnosed with diabetes. A significant number of them are children: type 1 diabetes mellitus is estimated to affect about 1 in 600 children between the ages of 5 and 15 years. The incidence of this condition continues to increase.

Diabetes is often considered an adult disease, but at least 5% of cases begin in childhood, usually at about 6 years of age or around the time of puberty. Management of diabetes in children is different from that in adults and requires conscientious care geared to the child's developmental stage.

Pathogenesis

The exact pathophysiology of diabetes is not completely understood; however, it is known to result from dysfunction of the beta (insulin-secreting) cells of the islets of Langerhans in the pancreas. Some researchers believe that the presence of an acute infection during childhood may trigger a mechanism in genetically susceptible children, activating beta-cell dysfunction and disrupting insulin secretion. Other conditions that may contribute to type 1 diabetes are pancreatic tumors, pancreatitis, and long-term corticosteroid use.

Normally, the sugar derived from digestion and assimilation of foods is burned to provide energy for the body's activities. Excess sugar is converted into fat or glycogen and stored in the body tissues. Insulin, a hormone secreted by the pancreas, is responsible for the burning and storage of sugar. In diabetes, the secretion of insulin is inadequate or nonexistent, allowing sugar to accumulate in the bloodstream and spill over into the urine. In children, type 1 diabetes causes an abrupt pronounced decrease in insulin production, resulting in decreased ability to derive energy from the food eaten. Large amounts of protein and fat are used to supply the child's energy needs, causing loss of weight and slowed growth. This combination of failure to gain weight and lack of energy may be the initial reason the child is brought to the

TABLE 23.4 Comparison of Type 1 and Type 2 Diabetes		
Assessment	Type 1 Diabetes	Type 2 Diabetes
Age at onset	5–7 y or at puberty	Increasingly occurring in younger children
Type of onset	Abrupt	Gradual
Weight changes	Marked weight loss is often initial sign	Associated with obesity
Other symptoms	Polydipsia Polyuria (often begins as bed-wetting) Fatigue (marks fall in school) Blurred vision (marks fall in school) Glycosuria Polyphagia Pruritus Mood changes (may cause behavior problems in school)	Polydipsia Polyuria Fatigue Blurred vision Glycosuria Pruritus Mood changes
Therapy	Hypoglycemic agents never effective; insulin needed Diet only moderately restricted; no dietary foods used Common-sense foot care for growing children	Managed by diet, oral hypoglycemic agents, or insulin Diet tends to be strict Good skin and foot care necessary
Period of remission	Period of remission for 1–12 mo generally follows initial diagnosis	Not demonstrable

Adapted from Pillitteri, A. (2007). *Maternal and child health nursing* (5th ed). Philadelphia: Lippincott Williams & Wilkins.

health care provider's attention. However, a health care provider may not see the child until symptoms of ketoacidosis are evident.

Clinical Manifestations

Classic symptoms of type 1 diabetes mellitus are **polyuria** (dramatic increase in urinary output, probably with enuresis), **polydipsia** (increased thirst), and **polyphagia** (increased hunger and food consumption). These symptoms are usually accompanied by weight loss or failure to gain weight and lack of energy, even though the child has increased food consumption. Symptoms of diabetes in children often have an abrupt onset.

If the child's symptoms are not noted and referred for diagnosis, the disorder is likely to progress to diabetic ketoacidosis. Because of inadequate insulin production, carbohydrates are not converted into fuel for energy production. Fats are then mobilized for energy but are incompletely oxidized in the absence of glucose. Ketone bodies (acetone, diacetic acid, and oxybutyric acid) accumulate. They are readily excreted in the urine, but the acid–base balance of body fluids excreted is upset and results in acidosis.

Diabetic ketoacidosis is characterized by drowsiness, dry skin, flushed cheeks and cherry-red lips, acetone breath with a fruity smell, and **Kussmaul breathing** (abnormal increase in the depth and rate of the respiratory movements). Nausea and vomiting may occur. If untreated, the child lapses into coma and

exhibits dehydration, electrolyte imbalance, rapid pulse, and subnormal temperature and blood pressure.

Diagnosis

Early detection and control are critical in postponing or minimizing later complications of diabetes. The nurse should observe carefully for any signs or symptoms in all members of a family with a history of diabetes. The family also should be taught to observe the children for frequent thirst, urination, and weight loss. All relatives of diabetics are considered a high-risk group and should have periodic testing.

At each visit to a health care provider, children with a family history of diabetes should be monitored for glucose using a fingerstick glucose test and for ketones in the urine using a urine dipstick test. If the blood glucose level is elevated or ketonuria is present, a fasting blood sugar (FBS) is performed. An FBS result of 200 mg/dL or higher almost certainly is diagnostic for diabetes when other signs such as polyuria and weight loss, despite polyphagia, are present.

Although glucose tolerance tests are performed in adults to confirm diabetes, they are not commonly used in children. The traditional oral glucose tolerance test is often unsuccessful in children because they may vomit the concentrated glucose that must be swallowed.

Treatment

Management of type 1 diabetes in children includes insulin therapy and a meal and exercise plan. Treatment of the diabetic child involves the family and

Action	Preparation	Onset (hrs)	Peak (hrs)	Duration (hrs)
Rapid-acting	Lispro Humalog	0.25	0.5–1	3–4
Short-acting	Regular	0.5–1	2–4	5–7
Intermediate-acting	NPH	1.5–2	6–12	18–24
	Lente	1.5–2	6–12	18–24
Long-acting	Ultralente	4–6	18–24	36–48

References may vary slightly on these figures.

child and a number of health team members, such as the nurse, the pediatrician, the nutritionist, and the diabetic nurse educator. After diabetes is diagnosed, the child may be hospitalized for a period of time. This allows the condition to be stabilized under supervision. This is a trying time, and the nurse must plan care with an understanding of the emotional impact of the diagnosis. The child’s teacher, the school nurse, and others who supervise the child during daily activities must be informed of the diagnosis.

Insulin Therapy. Insulin therapy is an essential part of the treatment of diabetes in children. The dosage of insulin is adjusted according to blood glucose levels so that the levels are maintained near normal. Two kinds of insulin are often combined for the best results. Insulin can be grouped into rapid acting, short acting, intermediate acting, and long acting (Table 23–5).

An intermediate-acting and a short-acting insulin often are given together. Some preparations come in a premixed proportion of 70% intermediate-acting and 30% short-acting insulin, eliminating the need for mixing. Many children are prescribed an insulin regimen in which a dose containing a short-acting insulin and an intermediate-acting insulin are given at two times during the day: one before breakfast and the second before the evening meal. Children’s insulin doses need to be individually regulated to keep their blood glucose levels as close to normal as possible.

Good news. Lispro or Humalog insulin can be administered immediately after the child has eaten, so the amount of food eaten can be taken into consideration when determining the dosage.



The introduction of rapid-acting insulin, such as Lispro or Humalog, has greatly changed insulin administration in children. The onset of action of rapid-acting insulin is less than 15 minutes. Rapid-acting insulin can even be

used after a meal in children with unpredictable eating habits (Plotnick, 2006).

Insulin Reaction. Insulin reaction (insulin shock, hypoglycemia) is caused by insulin overload, resulting in too-rapid metabolism of the body’s glucose. This may be attributable to a change in the body’s requirement, carelessness in diet (such as failure to eat proper amounts of food), an error in insulin measurement, or excessive exercise. Because diabetes in children is very labile (unstable, fluctuating), the child is subject to insulin reactions.

Some symptoms of impending insulin reaction in children are any type of odd, unusual, or antisocial behavior; weakness; nervousness; lethargy; headache; blurred vision and dizziness; and undue fatigue or hunger. Other symptoms might include pallor, sweating,

This advice could be a life-saver. Treatment of an insulin reaction should be immediate.



ing, convulsions, and coma. Children often have hypoglycemic reactions in the early morning. The nurse must observe the child at least every 2 hours during the night. Note tossed bedding, which would indicate restlessness, and any excessive perspiration. If necessary, try to arouse the child. As the child becomes regulated and observes a careful diet at home, parents do not need to watch so closely but should have a thorough understanding of all aspects of this condition. Blood glucose monitoring often is scheduled for this early morning time in an effort to detect abnormal glucose levels.

To treat an insulin reaction, give the child sugar, candy, orange juice, or one of the commercial products designed for this emergency. Repeated or impending reactions require consultation with the physician.

If the child cannot take a sugar source orally, glucagon should be administered subcutaneously to bring about a prompt increase in the blood glucose level. Every adult responsible for a diabetic child should clearly understand the procedure for administering this drug and should have easy access to it. Glucagon is a hormone produced by alpha cells of the pancreatic islets. An elevation in the blood glucose

level results in insulin release in a normal person, but a decrease in the blood glucose level stimulates glucagon release. The released glucagon in the bloodstream acts on the liver to promote glycogen breakdown and glucose release. Glucagon is available as a pharmaceutical product and is packaged in prefilled syringes for immediate use. It is administered in the same manner as insulin.

Glucagon acts within minutes to restore consciousness, after which the child can take candy or sugar. This treatment prevents the long delay while waiting for a physician to administer IV glucose or for an ambulance to reach the child. However, it is not a substitute for proper medical supervision.

Insulin Regimen. Most children with newly diagnosed diabetes show a decreased need for insulin during the first weeks or months after control is established. This is often referred to as the “honeymoon period,” and it should be explained to the family in advance to avoid false hope. As the child grows, the need for insulin increases and continues to do so until the child reaches full growth. Again, family caregivers need to know that this is normal and that the child’s condition is not getting worse.

Insulin Administration Methods. Insulin often is administered subcutaneously at different times of the day, or it may be administered continuously via a pump.

The child may not be able to take over management of the insulin injection as early as blood glucose monitoring, but he or she can watch the preparation of the syringe and learn the technique for drawing up the dosage. It may be helpful to encourage the child to watch the process until it becomes routine. By 8 or 9 years of age, the child should be encouraged to talk with the caregiver about the dose and to practice working with the syringe. The child also may draw up the dose and prepare for self-administration. The age at which this is possible varies. No two children mature at the same rate; some may be able to do this much earlier than others. Automatic injection devices can help the child self-administer insulin at a younger age. The child should be encouraged to take over the management of the therapy when ready. If included in decision making, the child can learn the importance of the routine and accept the restrictions the disease imposes.

The insulin pump is a method of continuous insulin administration useful for some diabetics. The pump is about the size of a transistor radio and can be worn strapped to the waist or on a shoulder strap. It delivers a steady low dose of insulin through a syringe housed in the pump and connected by polyethylene tubing to a small-gauge subcutaneous needle implanted in the abdomen. Extra insulin is released at mealtimes and other times when needed by pressing a

button. The pump does not sense the blood glucose level; therefore careful blood glucose monitoring at least four times a day is necessary to adjust the dosage as needed. The pump must be removed to bathe, swim, or shower. The child may want to wear loose clothing to hide the pump. The needle site must be regularly observed for redness and irritation. The site is changed every 24 to 48 hours using aseptic technique.

Unique Needs of the Adolescent. Adolescence is an extremely trying period for many diabetics, as it is for other young people. Diabetics, like healthy adolescents, must work from dependence to independence. Even when an adolescent has accepted responsibility for self-care, it is not unusual for him or her to rebel against the control that this condition demands, become impatient, and appear to ignore future health. The adolescent may skip meals, drop diet controls, or neglect glucose monitoring. Going barefoot and neglecting proper foot care also can cause problems for the diabetic adolescent. It can be a difficult time for both the family and the adolescent. The caregivers naturally become concerned and are apt to give the adolescent more controls to rebel against. Special care should be taken by the family, teachers, nurses, and physicians to see that these young people find enough maturing satisfaction in other areas and do not need to rebel in this vital area.

The adolescent who completely understands all aspects of the condition (especially if allowed to assume control of treatment previously) should be allowed to continue managing her or his own treatment. Should the adolescent run into difficulty, an adolescent clinic can be of great value. There the adolescent can discuss problems with understanding people who respond with care and provide dignity and attentive listening.

Treatment of Diabetic Ketoacidosis. Treatment for ketoacidosis requires skilled nursing care, and the child may be admitted to a pediatric intensive care unit. Fluid depletion is corrected; blood and urine glucose levels and other blood studies are monitored closely to evaluate the degree of ketoacidosis and electrolyte imbalance. If the child cannot urinate, a catheter is inserted. Regular insulin is given intravenously along with IV electrolyte fluids.

● Nursing Process for the Child With Type 1 Diabetes Mellitus

ASSESSMENT

When collecting data, ask the caregiver about the child’s symptoms leading up to the present illness. Ask about the child’s appetite, weight loss or gain,

evidence of polyuria or enuresis in a previously toilet-trained child, polydipsia, dehydration (which may include constipation), irritability, and fatigue. Include the child in the interview and encourage him or her to contribute information. Observe for evidence of the child's developmental stage to help determine appropriate nursing diagnoses and plan effective care. If the child is first seen in diabetic ketoacidosis, adjust the initial nursing interview accordingly.

In the physical exam, measure the height and weight and examine the skin for evidence of dryness or slowly healing sores. Note signs of hyperglycemia, record vital signs, and collect a urine specimen. Perform a blood glucose level determination using a bedside glucose monitor.

SELECTED NURSING DIAGNOSES

- **Imbalanced Nutrition: Less Than Body Requirements** related to insufficient caloric intake to meet growth and development needs and the inability of the body to use nutrients
- **Risk for Impaired Skin Integrity** related to slow healing process and decreased circulation
- **Risk for Infection** related to elevated glucose levels
- **Readiness for Enhanced Management of Therapeutic Regimen** related to blood glucose levels
- **Deficient Knowledge** related to complications of hypoglycemia and hyperglycemia
- **Deficient Knowledge** related to insulin administration
- **Deficient Knowledge** related to appropriate exercise and activity
- **Compromised Family Coping** related to the effect of the disease on the child's and family's life
- **Risk for Impaired Adjustment** related to long-term management of chronic disease

OUTCOME IDENTIFICATION AND PLANNING

The major goals for the child include maintaining adequate nutrition, promoting skin integrity, preventing infection, regulating glucose levels, and learning to adjust to having a chronic disease. Goals for the child and family include learning about and managing hypoglycemia and hyperglycemia, insulin administration, and exercise needs for the child. An additional goal is for family members to express their concerns about coping with the child's illness.

IMPLEMENTATION

Ensuring Adequate and Appropriate Nutrition

The child with diabetes needs a sound nutritional program that provides adequate nutrition for normal

FAMILY TEACHING TIPS



Child's Diabetic Food Plan

- Plan well-balanced meals that are appealing to child.
- Be positive with child when talking about foods that he or she can eat; downplay the negatives.
- Space three meals and three snacks throughout the day. Daily caloric intake is divided to provide 20% at breakfast, 20% at lunch, 30% at dinner, and 10% at each of the snacks.
- Calories should be made up of 50% to 60% carbohydrates, 15% to 20% protein, and no more than 30% fat.
- Avoid concentrated sweets such as jelly, syrup, pie, candy bars, and soda pop.
- Artificial sweeteners may be used.
- Child must not skip meals. Make every effort to plan meals with foods that the child likes.
- Include foods that contain dietary fiber such as whole grains, cereals, fruits and vegetables, nuts, seeds, and legumes. Fiber helps prevent hyperglycemia.
- Dietetic food is expensive and unnecessary.
- Keep complex carbohydrates available to be eaten before exercise and sports activities to provide sustained carbohydrate energy sources.
- Teach child day by day about the food plan to encourage independence in food selections when at school or away from home.

growth while it maintains the blood glucose at near-normal levels. The food plan should be well balanced with foods that take into consideration the child's food preferences, cultural customs, and lifestyle (see Family Teaching Tips: Child's Diabetic Food Plan).

Help the child and caregiver to understand the importance of eating regularly scheduled meals. Special occasions can be planned so that the child does not feel left out of celebrations. If a particular meal is going to be late, the child should have a complex carbohydrate and protein snack. Children should be included in meal planning when possible to learn what is permissible and what is not. In this way they can handle eating when they are on their own in school and in social situations.

Preventing Skin Breakdown

Skin breakdowns, such as blisters and minor cuts, can become major problems for the diabetic child. Teach the caregiver and child to inspect the skin daily and promptly treat even small breaks in the skin. Encourage daily bathing. Teach the child and caregiver to dry the skin well after bathing, and give careful attention to any area where skin touches skin, such as the groin, axilla, or other skin folds. Emphasize good foot care. This includes wearing well-fitting shoes,

inspecting between toes for cracks, trimming nails straight across, wearing clean socks, and not going barefoot. Establishing these habits early helps the child prepare for lifelong care of diabetes.

Preventing Infection

Diabetic children may be more susceptible to urinary tract and upper respiratory infections. Teach the child and caregiver to be alert for signs of urinary tract infection, such as itching and burning on urination. Instruct them to report signs of urinary tract or upper respiratory infections to the care provider promptly.

Many children are subject to minor infections and illnesses during the school years with little long-term effect. However, the diabetic child is more susceptible to long-term complications. When the diabetic child has an infection and fever, the temperature and metabolic rate increase and the body needs more sugar and, therefore, more insulin to make the sugar available to the body. Although the child may not be eating because of vomiting or anorexia, the body still needs insulin. Insulin should never be skipped during illness. Blood glucose levels should be checked every 2 to 4 hours during this time. Fluids need to be increased. Instruct the caregivers to contact the care provider when the child becomes ill, especially if the child is vomiting, cannot eat, or has diarrhea, so that close supervision can be maintained. Give the caregiver guidelines for care of an ill child with the initial diabetic instructions.

It is extremely important for the child to wear a MedicAlert identification medal or a bracelet with information about diabetic status. Identification cards, such as those carried by many adult diabetics, are seldom practical for a child.

Regulating Glucose Levels

The child who is seen in the health care facility with diabetes may have a new diagnosis or may be experiencing an unstable episode as a result of illness or changing needs. The child's blood glucose level must be monitored to maintain it within normal limits. Determine the blood glucose level at least twice a day, before breakfast and before the evening meal, by means of bedside glucose monitoring.

On initial diagnosis of diabetes, the blood glucose level should be checked as often as every 4 hours until some stability is achieved. Because regular monitoring of the blood glucose level is necessary, teach the child and the caregiver how to perform monitoring (Fig. 23-6).

Because this procedure involves a fingerstick, the child may object and resist it. Offer encouragement and support, helping the child to express fears and acknowledging that the fingerstick does hurt and it is acceptable to dislike it. Consider the child's developmental stage when performing the testing. Table 23-6



● **Figure 23.6** Child uses an automatic lancet to get blood sample (*left*) and blood glucose monitor to determine blood glucose level (*right*).

provides some guidelines for diabetic care and teaching based on developmental stage. School-age children can be involved in much of the process. Encourage the child to choose the finger to be used and clean it with soap and water. Automatic-release instruments make it easier for the child to do the fingerstick. Teach the child to read the results and learn the desired level. School-age children, in the stage of industry versus inferiority, are usually interested in learning new information. Appeal to this developmental characteristic to gain the cooperation of a child this age.

Providing Child and Family Teaching in the Management of Hypoglycemia and Hyperglycemia

The child is monitored closely for signs of hypoglycemia or hyperglycemia. If the blood glucose level is higher than 240 mg/dL, the urine may be tested for ketones. In addition, during an illness the urine ketones are monitored. Be aware of the most likely times for an increase or decrease in the blood glucose level in relation to the insulin the child is receiving. Teach the child and family to recognize the signs of both hypoglycemia and hyperglycemia (see Family Teaching Tips: Signs of Hypoglycemia and Hyperglycemia) and how to be prepared to take the appropriate action if necessary. They must be alert to signs of hypoglycemia, especially when insulin is at peak action (see Table 23-5).

Teach them to treat blood glucose levels lower than 60 mg/dL with juice, sugar, or nondiet soda. If the blood glucose level cannot be checked promptly, the child should still consume a simple carbohydrate if there are any signs of hypoglycemia.

If the child cannot swallow, glucagon or dextrose should be administered following the physician's orders. Glucagon is commercially available and can be

TABLE 23.6 Developmental Guidelines for Diabetic Child Responsibilities*						
Issue	Age (yr)					
	Under 4	4–5	6–7	8–10	11–13	14+
Food	Teaching focuses on parents	Knows likes and dislikes	Can begin to tell sugar content of food and know foods he or she should not have	Has more ability to select foods according to criteria like exchange lists	Knows if foods fit own diet plan	Helps plan meals and snacks
Insulin	Parents take responsibility for care	Can tell where injection should be Can pinch the skin	Can begin to help with aspects of injections	Gives own injections with supervision	Can learn to measure insulin	Can mix two insulins
Testing		Can choose finger for finger stick Can wash finger with soap and water Collects urine; should watch caregiver do testing; helps with recording	Can do own finger stick using automatic puncture device. Can help with some aspects of blood test. Can do own urine test and record results	Can do blood tests with supervision	Can see test results forming a pattern	Can begin to use test results to adjust insulin
Psychological		Identifies with being “bad” or “good”; these words should be avoided. A child this age may think he or she is bad if the test is said to be “bad.”	Needs many reminders and supervision	Needs reminders and supervision Understands only immediate consequences, not long-term consequences, of diabetes control. “Scientific” mind developing; intrigued by tests.	May be somewhat rebellious Concerned with being “different”	Understands long-term consequences of actions, including diabetes control Independence and self-image are important Rebellion continues and some supervision and continued support are still needed

*These are only guidelines. Each child is an individual. Talk to your health care provider about any concerns you may have.

administered intramuscularly or subcutaneously. Teach the caregiver how to mix and administer it.

Instruct the child to get help immediately when signs of hypoglycemia occur and to carry and take sugar cubes, Lifesavers, gumdrops, or a small tube of cake frosting. The reaction should be followed with a snack of a complex carbohydrate, such as crackers, and a protein, such as cheese, peanut butter, or half of a meat sandwich. The snack is needed to maintain the increase in blood glucose level created by the simple carbohydrates and to prevent another hypoglycemic reaction.

Reassure the caregiver and the child that hypoglycemia is much more likely to occur than hyper-

glycemia. If there is any doubt as to whether the child is having a hypoglycemic or a hyperglycemic reaction, treat it like hypoglycemia. Instruct caregivers to keep a record of the hypoglycemic reactions to determine if there is a pattern and if the insulin schedule or food plan needs to be adjusted.

Providing Child and Family Teaching on Insulin Administration

Teach the family caregiver and the child the correct way to give insulin. Disposable syringes make caring for equipment relatively easy. A doll may be used to practice the actual administration until the caregiver (and child, if old enough) is comfortable and confi-

FAMILY TEACHING TIPS

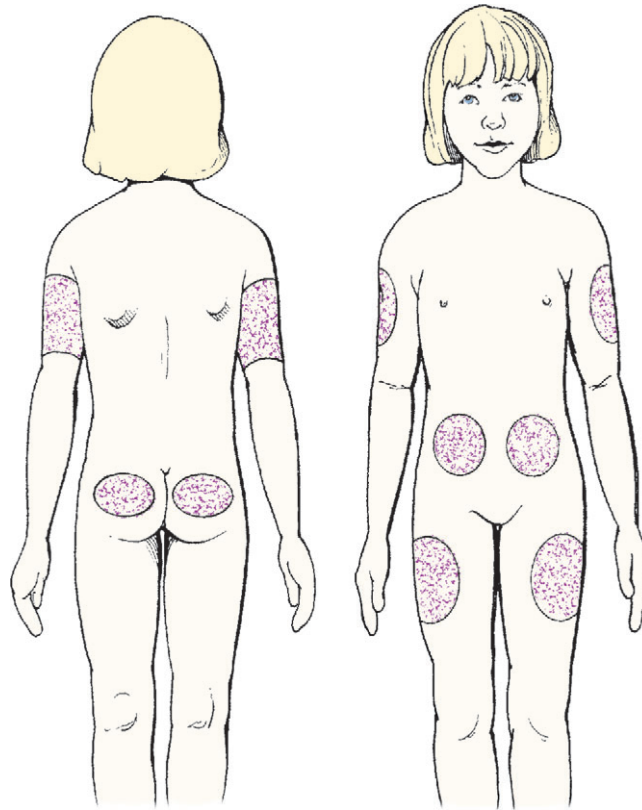
Signs of Hypoglycemia and Hyperglycemia

HYPOGLYCEMIA

- Shaking
- Irritability
- Hunger
- Diaphoresis
- Dizziness
- Drowsiness
- Pallor
- Changed level of consciousness
- Feeling “strange”

HYPERGLYCEMIA

- Polyphagia (excessive hunger)
- Polyuria (excessive urination)
- Dry mucous membranes
- Poor skin turgor
- Lethargy
- Change in level of consciousness



● **Figure 23.7** Subcutaneous injection sites.

dent. Provide direct supervision until proficiency is demonstrated.

Insulin administration is probably the most threatening aspect of the illness. Remember your feelings when you gave your first injection in nursing school. The child and family need a great deal of empathy and warm support. Increasing their confidence and skills of insulin administration will reduce their fear.

Give clear instructions concerning the importance of rotating injection sites. A site that is used too frequently is apt to become indurated and eventually fibrosed, which hinders proper insulin absorption. The atrophic hollows in the skin, or the lumps of hypertrophied tissue, are unsightly as well. Some people appear to have greater skin sensitivity than do others. Areas on the upper arms, upper thighs, abdomen, and buttocks can be used (Fig. 23–7).

Use of a careful plan allows several weeks to elapse before a site is used again. Usually, four to six injections are given in one area before going on to the next area. Starting from the inner upper corner of the area, each injection is given $\frac{1}{2}$ inch below the preceding one, going down in a vertical line. The next series of injections in this area would start $\frac{1}{2}$ inch outward at the upper level. If there is any sign of induration, the local site should be avoided for a few weeks until all signs of irritation have disappeared. A chart recording the sites used and the rotation schedule is recommended.

Providing Child and Family Teaching About Exercise and Activity

Exercise decreases the blood glucose level because carbohydrates are being burned for energy. The therapeutic program should be adjusted to allow for this increase in energy requirements to avoid hypoglycemia. Adjustments also may be needed in the child's school schedule. For instance, physical education should never be scheduled right before lunch for a diabetic child. Also, the diabetic child should not be scheduled for a late lunch period.

Promoting Family Coping

When the diagnosis of diabetes is confirmed, the family caregiver may feel devastated. A young child will not understand the implications, but the school-age or adolescent child will experience a great amount of fear and anxiety. The caregiver may have feelings of guilt, resentment, or denial. Other family members also may experience strong feelings about the illness. All these feelings and concerns must be recognized and resolved to work successfully with the diabetic child. Encourage the family to express these feelings and fears. To help him or her deal with feelings, involve the caregiver in the child's caring during hospitalization. Carefully listen to questions and answer them completely and honestly. Many written

materials are available to give to the caregiver, but be sure the caregiver can read and understand them. Videos are also available that are helpful in educating the diabetic and the family. Recommend available community support groups. Cover home care in detail. Provide the family caregiver with a support person to contact when questions arise after discharge.

Because so much information must be absorbed in a brief time, the caregivers may seem forgetful or confused. Careful patient repetition of all aspects of diabetes and the child's care is necessary. When anxiety levels are high, information is often heard but not digested. Provide written material in an understandable form. Have caregivers repeat information, and question them to confirm that they understand. Demonstrate warmth and caring throughout the teaching to increase the family's comfort; this also develops their confidence in nursing responses to their questions and apprehensions.

Promoting Self-Care and Positive Self-Esteem

The school-age or older child may experience some strong feelings of inadequacy or being "sick." These feelings must be expressed and handled. To help allay fear, teach the child as much as is appropriate for his or her age. Tell the child about athletes and other famous people who are diabetic. When possible, another child who is diabetic may visit so that the child does not feel so alone. Encourage the child to become active in helping with self-care. Answer questions about how diabetes will affect the child's activities. Summer camps for children with diabetes are available in many areas and can help develop the child's self-assurance.

The diabetic child can participate in normal activities. However, at least one friend should be told about the diabetic condition, and the child should not go swimming or hiking without a responsible person nearby who knows what to look for and what to do if the child has a reaction.

Some children are sensitive about their condition and fear they seem different from their friends. Even with the best instruction and preparation, they may feel this way and wish to keep their condition secret. They must understand that a teacher or some other adult in their environment must be acquainted with their condition. Classroom teachers need to know which of their students have such a condition and should understand the signs of an impending reaction.

Diabetic children with their glucose levels under good control do not need to be kept from activities such as camp-outs, overnight trips with the school band, or other similar activities away from home. Of

course, these children must first be capable of measuring their insulin and giving their own injections. Some young people may find that a desire to participate in such an activity can be the factor that helps them overcome reluctance to measure and administer their own insulin.

EVALUATION: GOALS AND EXPECTED OUTCOMES

- **Goal:** The child's caloric intake will be adequate to meet nutritional needs and to maintain appropriate growth.
Expected Outcomes: The child eats food at meals and snack times and maintains normal weight for age and height; the child and caregiver demonstrate understanding of meal planning by making appropriate menu selections.
- **Goal:** The child's skin integrity will be maintained.
Expected Outcomes: The child's skin is intact with no signs of breakdown; the child and caregiver describe skin inspection and care.
- **Goal:** The child will be free from signs and symptoms of infection.
Expected Outcomes: The child shows no signs of infection; temperature is within normal range; the child and caregiver discuss the importance of promptly reporting infections.
- **Goal:** The child will maintain normal glucose levels.
Expected Outcomes: The child's blood glucose level is 60 to 100 mg/dL; the urine is negative for ketones; there are no signs of hypoglycemia or hyperglycemia.
- **Goal:** The child and caregiver will verbalize an understanding of the signs, symptoms, and management of hypoglycemia and hyperglycemia.
Expected Outcomes: The child and caregiver list the signs of hypoglycemia and hyperglycemia and discuss how to handle each; they ask questions to clarify information.
- **Goal:** The child and caregiver will verbalize an understanding of insulin administration.
Expected Outcomes: The child and caregiver demonstrate insulin injection, describe various types of insulin and their reaction and peak times, and develop a site rotation schedule.
- **Goal:** The child and caregiver will verbalize an understanding of exercise and activity for a diabetic child.
Expected Outcome: The child and caregiver describe the effects of exercise on the blood glucose levels.

30 UNIT 5 ● Care of the Child

- **Goal:** The child and caregiver will express their concerns about coping with the child's illness.
Expected Outcomes: As appropriate for age, the child discusses necessary adjustments to the daily schedule and activities and names several people to inform about the diabetic condition. The caregiver demonstrates support of the child in managing daily and long-term care of diabetes.
- **Goal:** The child will show adjustment and have a positive attitude about the condition.
Expected Outcomes: The child expresses feelings about having diabetes and participates in age-appropriate activities and realistic goal planning.

TEST YOURSELF

- What do the terms polyuria, polydipsia, and polyphagia mean?
- What causes diabetic ketoacidosis to occur?
- How is type 1 diabetes in the child treated?
- Describe the symptoms of hypoglycemia and hyperglycemia.

Type 2 Diabetes Mellitus

Type 2 diabetes mellitus, also referred to as non-insulin-dependent diabetes, is a condition in which the body does not use insulin properly. Previously, type 2 diabetes was primarily diagnosed only in adults, usually over 45 years of age and overweight. More recently, this type of diabetes has been diagnosed in children and adolescents. In particular, children who are overweight, have a family history of type 2 diabetes, or are from a race or ethnic group such as American Indian, African American, Hispanic, or Asian are at the greatest risk of developing type 2 diabetes.

Clinical Manifestations and Diagnosis

Many of the symptoms of type 2 diabetes are similar to those of type 1 diabetes—polydipsia, polyuria, and polyphagia (see Table 23–4 for a comparison between types 1 and 2 diabetes). The child is usually overweight or obese. Symptoms are often present for months before a diagnosis is made. Many times type 2 diabetes is diagnosed when a urine screening test is performed for some other reason and glucosuria is found. In addition, these children have high blood glucose levels. Although diabetic ketoacidosis is not common in adults diagnosed with type 2 diabetes, the condition may be seen in children with the diagnosis.

Treatment

One goal of treatment is to achieve normal or close to normal blood glucose levels. A second goal of treatment is to prevent or decrease the occurrence of long-term complications, such as neurologic, kidney, and eye conditions. If the child presents with diabetic ketoacidosis, initial treatment is insulin administration, but then oral hypoglycemic agents such as metformin are often effective for controlling blood glucose levels. Lifestyle changes such as weight loss and increased exercise are important aspects of treatment for the child.

Nursing Care

Recognizing the child who is at high risk for type 2 diabetes is critical in changing the lifestyle behaviors that increase the child's risk. The nurse must work with both the child and the family caregivers to change patterns. Healthy eating habits and dietary modifications help with management of the disease. Increasing physical activity and exercise are additional lifestyle changes that must be promoted. Monitoring blood glucose levels, insulin administration, treatment of hypoglycemia and hyperglycemia, diabetic food plans, and family teaching for type 2 diabetes are the same as with type 1 diabetes.

GENITOURINARY DISORDERS

Although difficulties with diarrhea or constipation are common in school-age children, the most common cause for stress in the child and the caregiver is incontinence. Enuresis or encopresis can cause many days of frustration and discouragement for both the child and the caregiver.

Enuresis

Enuresis, or bed-wetting, is involuntary urination beyond the age when control of urination commonly is acquired. Many children do not acquire complete nighttime control before 5 to 7 years of age, and occasional bed-wetting may be seen in children as late as 9 or 10 years of age. Boys have more difficulty than do girls, and in some instances enuresis may persist into the adult years.

Enuresis may have a physiologic or psychological cause and may indicate a need for additional exploration and treatment. Physiologic causes may include a small bladder capacity, urinary tract infection, and lack of awareness of the signal to empty the bladder because of sleeping too soundly. Persistent bed-wetting in a 5- or 6-year-old child may be a result of rigorous toilet training before the child was physically

or psychologically ready. Enuresis in the older child may express resentment toward family caregivers or a desire to regress to an earlier level of development to receive more care and attention. Emotional stress can be a precipitating factor. The health care team also needs to consider the possibility that enuresis can be a symptom of sexual abuse.

Here's a tip for you to share.



An upcoming event the child is excited about attending, such as going to camp or visiting friends overnight, might be a motivator in helping the child with enuresis to achieve bladder control.

If a physiologic cause has been ruled out, efforts should be made to discover possible psychological causes, including emotional stress. If the child is interested in achieving control, waking the child during the night to go to the toilet or limiting

fluids before retiring may be helpful. However, these measures should not be used as a replacement for searching for the cause. Help from a pediatric mental health professional may be needed.

The family caregiver may become extremely frustrated about having to deal with smelly wet bedding every morning. The child may go to great efforts to hide the fact that the bed is wet. Health care personnel must take a supportive understanding attitude toward the problems of the caregiver and the child, allowing each of them to ventilate feelings and providing a place where emotions can be freely expressed.

Encopresis

Encopresis is chronic involuntary fecal soiling beyond the age when control is expected (about 3 years of age). Speech and learning disabilities may accompany this problem. If no organic causes (e.g., worms, megacolon) exist, encopresis indicates a serious emotional problem and a need for counseling for the child and the family caregivers. Some experts believe that overcontrol or undercontrol by a caregiver can cause encopresis. Recommendations for treatment differ; however, the most important goal is recognition of the problem and referral for treatment and counseling.

MUSCULOSKELETAL DISORDERS

The long bones of the extremities grow rapidly during the school-age period. "Growing pains" are a frequent complaint but rarely indicate serious disease. School

A Personal Glimpse



My 9-year-old daughter was potty trained when she was just barely 2 years old. I was so proud of her and happy that she was out of diapers and that she had so quickly been trained. When she was almost 4, I had her little brother. She occasionally had an accident and wet pants, but I wasn't concerned. I just thought she wanted some attention. It was quite upsetting to me when shortly after she started the second grade she started wetting the bed. At first she was wet a few times a week, then every night. One day I got a call from the school saying I needed to bring her some dry clothes because she had wet her pants at school. That is when the worst part began. Now at 9 years old she wets her pants every day. She takes dry clothes to school, but sometimes she just stays in her wet ones. She smells like urine all the time. It is so upsetting to me. I feel frustrated and sometimes angry. Most of all I just feel so bad for my daughter. Her friends make fun of her; she never wants to spend the night anywhere except at home, and now she doesn't even seem to care. About 3 weeks ago I started taking her to a counselor the school nurse recommended. I hope she can help my daughter and me understand and change what is going on for her. It is painful to watch this happen.

Angela

LEARNING OPPORTUNITY: What are some of the possible causes of this child's enuresis? What could you suggest to this mother to help her deal with her feelings regarding her child's situation?

age is a time of increasing physical activity, including team sports. Peer approval and group or team participation at school and in after-school activities are important to the school-age child. Minor skeletal injuries, such as sprains and minor fractures, may make the child a temporary celebrity. However, a serious skeletal defect or injury may influence the child's ability to cope with peer relationships and create social adjustment problems.

Fractures

A fracture, a break in a bone that is usually accompanied by vascular and soft tissue damage, is characterized by pain, swelling, and tenderness. Children's fractures differ from those of adults in that generally they are less complicated, heal more quickly, and usually occur from different causes. The child has an urge to explore the environment but lacks the experi-

ence and judgment to recognize possible hazards. In some instances, caregivers may be negligent in their supervision, but often the child uses immature judgment or is simply too fast for them.

The bones most commonly fractured in childhood are the clavicle, femur, tibia, humerus, wrist, and fingers. The classification of a fracture reflects

Did you know? When a child has a greenstick fracture, the bone bends and often just partially breaks, just as a green tree stick does when one tries to break it, thus the name “greenstick” fracture.

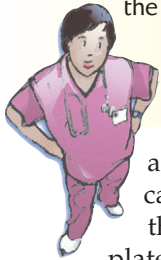


the kind of bone injury sustained (Fig. 23–8). If the fragments of fractured bone are separated, the fracture is said to be complete. If fragments remain partially joined, the fracture is termed incomplete. Greenstick fractures are

one kind of incomplete fracture, caused by incomplete ossification, common in children.

When a broken bone penetrates the skin, the fracture is called compound, or open. A simple, or closed,

Be aware. Fractures occurring in the epiphyseal plate (growth plate) can cause permanent damage.



fracture is a single break in the bone without penetration of the skin. Spiral fractures, which twist around the bone, are frequently associated with child abuse and are caused by a wrenching force. Fractures in the area of the epiphyseal plate (growth plate) can cause permanent damage and severely impair growth (Fig. 23–9).

Treatment and Nursing Care

Most childhood fractures are treated by realignment and immobilization using either traction or closed manipulation and casting. A few patients with severe fractures or additional injuries, such as burns and other soft tissue damage, may require surgical reduction, internal or external fixation, or both. Internal fixation devices include rods, pins, screws, and plates made of inert materials that do not trigger an immune reaction. They allow early mobilization of the child to a wheelchair, crutches, or a walker.

External fixation devices are used primarily in complex fractures often with other injuries or complications. These devices are applied under sterile conditions in the operating room and may be augmented by soft dressings and elevated by means of an overhead traction rope. External fixation devices rarely are used on young children.

Casts. The kind of cast used is determined by the age of the child, the severity of the fracture, the type of bone involved, and the amount of weight the

child is allowed to bear on the extremity. Most casts are formed from gauze strips impregnated with plaster

Have some fun with this.



Casts made of synthetic material are available in many colors. Children enjoy choosing a color that is a favorite, a school color, or a color associated with a specific holiday, such as red for Valentine’s Day.

of Paris or other synthetic material, such as fiberglass or polyurethane resin, which is pliable when wet but hardens when dry. Synthetic materials are lighter in weight and present a cleaner appearance because they can be sponged with water when soiled.

Synthetic casts dry more rapidly than do plaster of Paris casts. The lightweight casts tend to be used as arm casts and hip spica casts that are used to treat infants with congenital hip conditions. The hip spica cast covers the lower part of the body, usually from the waist down, and either one or both legs while leaving the feet open. The cast maintains the legs in a frog-like position. Usually, there is a bar placed between the legs to help support the cast.

The child and the family should be taught what to expect after the cast is applied and how to care for the casted area. A stockinette is applied over the area to be casted, and the bony prominences are padded before the wet gauze-impregnated rolls are applied. Although the wet plaster of Paris feels cool on the skin when applied, evaporation soon causes a temporary sensation of warmth. The cast feels heavy and cumbersome (Fig. 23–10).

A wet plaster cast should be handled only with open palms because fingertips can cause indentations and result in pressure points. If the cast has no protective edge, it should be petaled (see Figure 14–22B in Chapter 14) with adhesive tape strips. If the cast is near the genital area, plastic should be taped around the edge to prevent wetting and soiling of the cast.

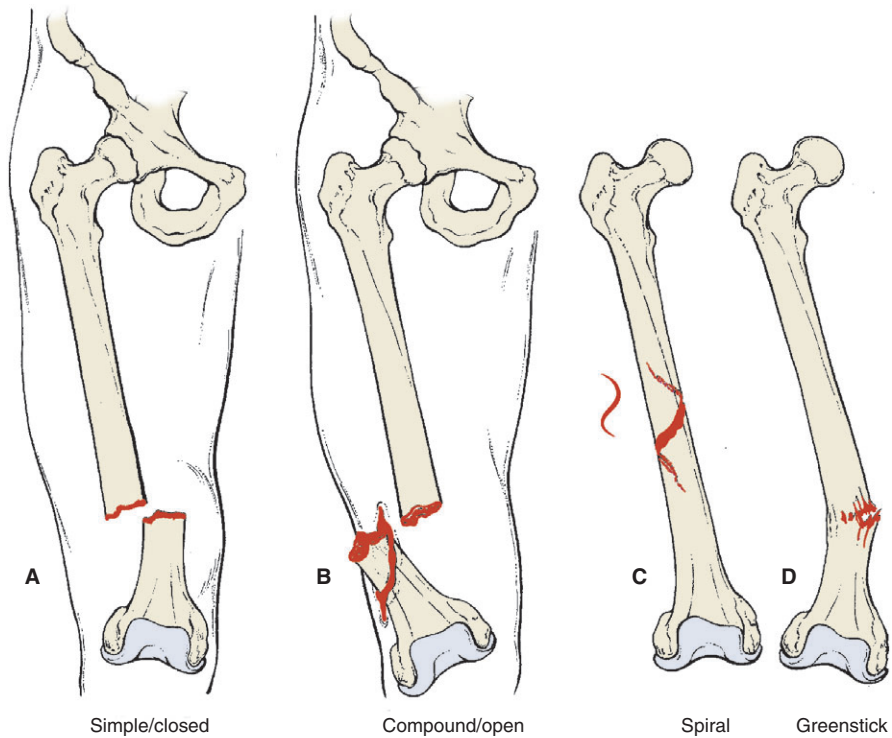
After the fracture has been immobilized, any reports of pain signal possible complications, such as

This is critical to remember.



Any complaint of pain in a child with a new cast or immobilized extremity needs to be explored and monitored closely for the possibility of compartment syndrome.

compartment syndrome, and should be recorded and reported immediately. Compartment syndrome is a serious neurovascular concern that occurs when increasing pressure within the muscle compartment causes decreased circulation. It is important for the nurse to monitor the child’s



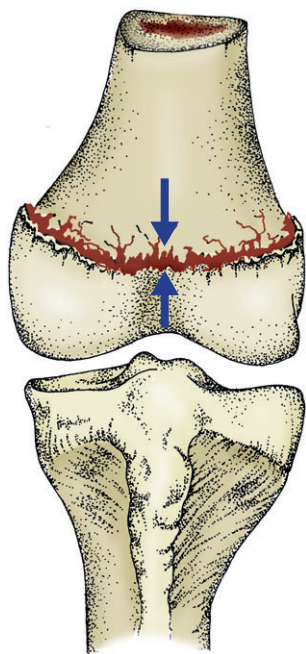
● **Figure 23.8** Types of fractures. All are examples of complete fractures except D, which is an incomplete fracture.

neurovascular status frequently because of the risk of tissue and nerve damage.

Monitoring the neurovascular status is sometimes referred to as CMS (circulation, movement, sensation) checks and includes observing, documenting, and reporting the five Ps:

- **Pain:** Any sign of pain should be noted and the exact area determined.
- **Pulse:** If an upper extremity is involved, check brachial, radial, ulnar, and digital pulses. If a lower extremity is involved, monitor femoral, popliteal, posterior tibial, and dorsalis pedis pulses.
- **Paresthesia:** Check for any diminished or absent sensation or for numbness or tingling.
- **Paralysis:** Check hand function by having the child try to hyperextend the thumb or wrist, oppose the thumb and little finger, and adduct all fingers. Check function of the foot by having the child try to dorsiflex and plantarflex the ankles and flex and extend the toes.
- **Pallor:** Check the extremity and the nail beds distal to the site of the fracture for color. Pallor, discoloration, and coldness indicate circulatory impairment.

In addition to the five Ps, any foul odor or drainage



● **Figure 23.9** One form of epiphyseal injury; a crushing injury (as might occur in a fall from a height) can destroy the layer of germinal cells of the epiphysis, resulting in disturbance of growth.

Here's a helpful hint.



Blowing cool air through a cast with a hair dryer set on a cool temperature or using a fan may help to relieve discomfort under a cast.

on or under the cast, "hot spots" on the cast (areas warm to touch), looseness or tightness, or any elevation of temperature must be noted, documented, and reported. Family caregivers should be instructed to watch

carefully for these same danger signals.



● **Figure 23.10** (A) Fiberglass cast is being applied (B) After cast application, nurse checks the circulation in the hand.

Children and caregivers should be cautioned not to put anything inside the cast, no matter how much the casted area itches. Small toys and sticks or stick-like objects should be kept out of reach until the cast has been removed.

When the fracture has healed, the cast is removed with a cast cutter. This can be frightening for the child unless the person using the cast cutter explains and demonstrates that the device will not cut flesh but only the hard surface of the cast. The child should be told that there will be vibration from the cast cutter, but it will not burn.

After cast removal, the casted area should be soaked in warm water to help remove the crusty layer of accumulated skin. Application of oil or lotion may prove comforting. Family caregivers and the child must be cautioned against scrubbing or scraping this area because the tender layer of new skin underneath the crust may bleed. Sunscreen should be applied to the previously casted area when the child will have sun exposure.

Traction. **Traction** is a pulling force applied to an extremity or other part of the body. A body part is pulled in one direction against a counter-pull or countertraction exerted in the opposite direction. A system of weights, ropes, and pulleys is used to realign and immobilize fractures, reduce or eliminate muscle spasm, and prevent fracture deformity and joint contractures.

Two basic types of traction are used: skin traction and skeletal traction. **Skin traction** applies pull on tape, rubber, or a plastic material attached to the skin, which indirectly exerts pull on the musculoskeletal system. Examples of skin traction are Bryant's traction, Buck extension traction, and Russell traction. **Skeletal traction** exerts pull directly on skeletal structures by means of a pin, wire, tongs, or other device surgically inserted through a bone. Examples of skeletal traction are 90-degree traction and balanced suspen-

sion traction. Dunlop's traction, sometimes used for fractures of the humerus or the elbow, can be either skin or skeletal traction. It is skeletal traction if a pin is inserted into the bone to immobilize the extremity (Fig. 23-11).

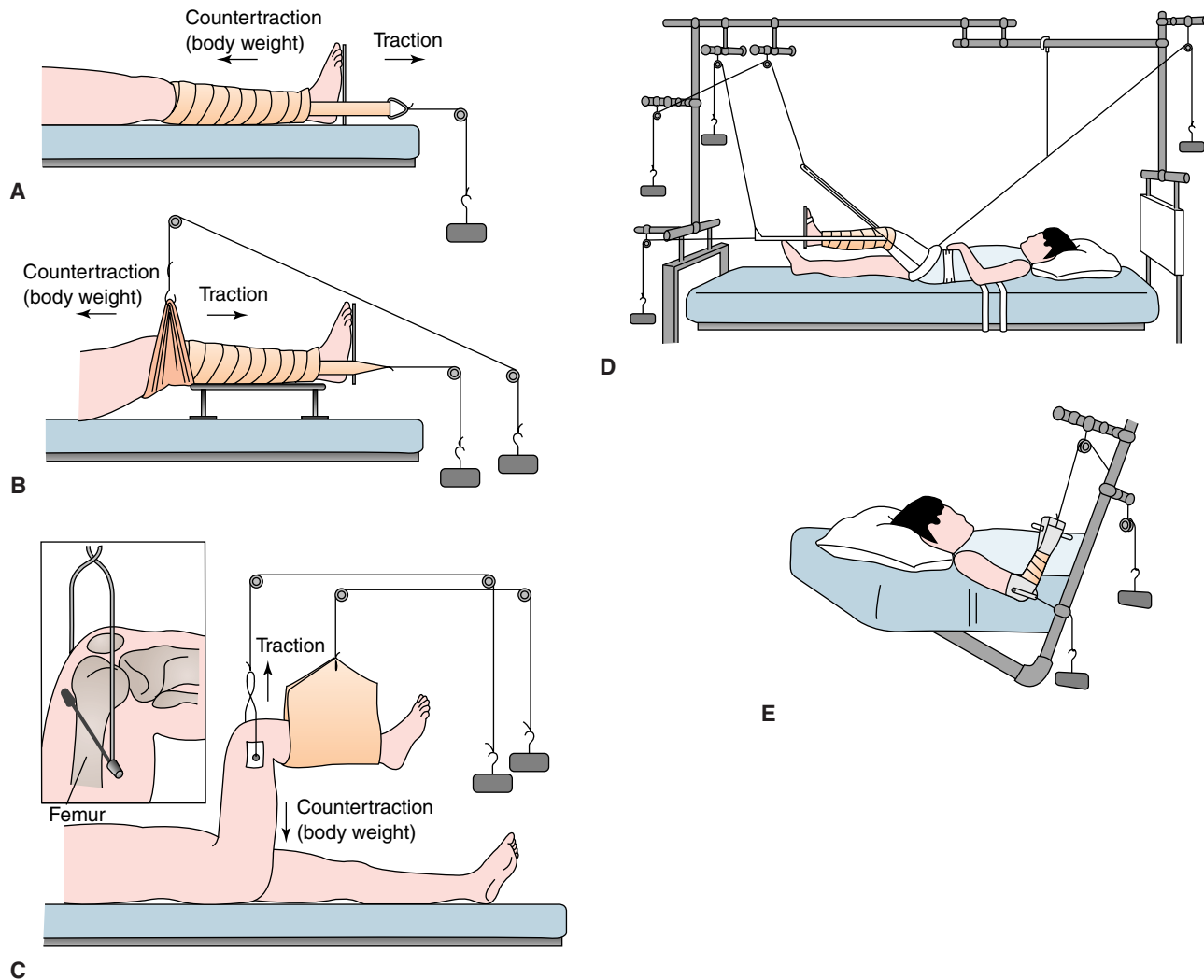
A Personal Glimpse



One day I was jumping on my bed, trying to do a flip, but instead I fell on my arm. It hurt really bad and I cried. I told my mom, and she put ice on it. But then I went to soccer camp the next day, and I fell on it again. It hurt even worse. My mom took me to the doctor's office. I could wiggle my fingers, but it only kind of hurt at the doctor's. So they took an x-ray. It was fun to see the picture of my arm. The next day I fell again at soccer camp; I was standing on my ball. This time my mom was sure it was broken. We went to get a cast. I chose a blue cast. My arm felt better, but I felt bad because it was my big sister's birthday. Everyone signed it. I had my cast on for 4 weeks. I couldn't wait to get it off. I finally got my cast off. I was excited! The girl used a saw to take it off. I wasn't scared. My arm really smelled bad! They took another x-ray to make sure my arm was better. It was!! Then we left and my mom washed my arm and put sunscreen on it. After that everyone had trouble telling me and my twin apart.

Cassey, age 8

LEARNING OPPORTUNITY: What explanations would you give this child regarding the reason the x-rays were taken, the process of putting the cast on, and what to expect when the cast was removed? Which actions carried out by this mother would be important for the nurse to reinforce as appropriate actions for this situation?



● **Figure 23.11** Types of traction. (A) Buck extension, skin traction. (B) Russell traction, skin traction. Two lines of traction (one horizontal and one vertical) allow for good bone alignment for healing. (C) 90-degree to 90-degree (skeletal) traction; a wire pin is inserted into the distal femur. (D) Balanced suspension traction. (E) Dunlop's traction (skeletal).

Bryant's traction (Fig. 23-12) is often used for the treatment of a fractured femur in children younger than 2 years of age. These fractures are often transverse (crosswise to the long axis of the bone) or spiral fractures. The child's legs are wrapped with elastic bandages that should be removed at least daily to observe the skin and then rewrapped. Skin temperature and the color of the legs and feet must be checked frequently to detect any circulatory impairment. The use of Bryant's traction entails some risk of compromised circulation and may result in contractures of the foot and lower leg, particularly in an older child. Severe pain may indicate circulatory difficulty and should be reported immediately. When a child is in Bryant's traction, the hips should not rest on the bed; a hand should be able to pass between the child's buttocks and the sheet.

Buck extension traction, in which the child's body provides the countertraction to the weights, is used for

short-term immobilization. It is used to correct contractures and bone deformities such as Legg-Calvé-Perthes disease. For older children, Russell traction seems to be more effective.

However, a child in either type of traction tends to slide down until the weights rest on the bed or

Pay attention to the details.



When a child is in traction the weights must be hanging freely, not touching the bed or floor.

the floor. The child should be pulled up to keep the weights free, the ropes must be in alignment with the pulleys, and the alignment should be checked frequently.

An older child may try to coax a roommate to remove the weights or the sandbags used as weights.

Children in any kind of traction must be carefully monitored to detect any signs of neurovascular com-



● **Figure 23.12** An infant in Bryant's traction is being fed.

plications. Skin temperature and color, presence or absence of edema, peripheral pulse, sensation, and motion must be monitored every hour for the first 24 hours after traction has been applied and every 4 hours after the first 24 hours unless ordered otherwise. Skin care must be meticulous. Skin preparation (Skin-Prep) should be used to toughen the skin rather than lotions or oils, which soften the skin and contribute to tissue breakdown.

Children in skeletal traction require special attention to pin sites. Pin care should be performed every 8 hours. The provider may order that povidone-iodine or a hydrogen peroxide solution be used to clean the pin sites. Standard precautions and aseptic technique reduce the risk for infection. Any sign of infection (odor, local inflammation, or elevated temperature) must be recorded and reported at once (see the Nursing Care Plan 23-1: The Child in Traction).

External Fixation Devices. In children who have severe fractures or conditions such as having one extremity shorter than the other, external fixation devices are used to correct the condition (Fig. 23-13). When an external fixation device is used, special skin care at the pin sites is also necessary. The sites are left open to the air and should be inspected and cleansed every 8 hours. The appearance of the pins puncturing the skin and the unusual appearance of the device can be upsetting to the child, so be sensitive to any anxiety the child expresses.

As early as possible the child (if old enough) or family caregivers should be taught to care for the pin sites. External fixation devices are sometimes left in place for as long as 1 year; therefore it is important that the child accepts this temporary change in body image and learns to care for the affected site. Children with these devices probably will work with a physical therapist during the rehabilitation period and will have specific exercises to perform. Before discharge from the hospital, the child should feel comfortable moving

about and should be able to recognize the signs of infection at the pin sites.

Crutches. Children with fractures of the lower extremities and other lower leg injuries often must learn to use crutches to avoid weight bearing on the injured area. Several types of crutches are available. The most common are axillary crutches, which are principally used for temporary situations. Forearm, or Canadian, crutches usually are recommended for children who need crutches permanently, such as paraplegic children with braces. Trough, or platform, crutches are more suitable for children with limited strength or function in the arms and hands.

The use of crutches is generally taught by a physical therapist, but it can be the responsibility of nurses. The type of crutch gait taught is determined by the amount of weight bearing permitted, the child's degree of stability, whether or not the knees can be flexed, and the specific treatment goal.

TEST YOURSELF

- Give examples of physiologic and psychological causes of enuresis.
- Explain the difference between a simple or closed fracture and a compound or open fracture.
- What is a greenstick fracture? What is a spiral fracture?
- How are fractures usually treated?
- What is monitored when doing neurovascular checks on a child with a fracture?

Osteomyelitis

Osteomyelitis is an infection of the bone usually caused by *Staphylococcus aureus*. Acute osteomyelitis is twice as common in boys and results from a primary infection, such as a staphylococcal skin infection (impetigo), burns, a furuncle (boil), a penetrating wound, or a fracture. The bacteria enter the bloodstream and are carried to the **metaphysis**, the growing portion of the bone, where an abscess forms, ruptures, and spreads the infection along the bone under the periosteum.

Clinical Manifestations and Diagnosis

Symptoms usually begin abruptly with fever, malaise, and pain and localized tenderness over the metaphysis of the affected bone. Joint motion is limited. Diagnosis is based on laboratory findings of leukocytosis

NURSING CARE PLAN 23.1

The Child in Traction

TD is a 9-year-old boy who has been hospitalized following a serious bicycle accident in which he was struck by a motor vehicle. In the accident he sustained a fractured right femur and several cuts and abrasions. He has been placed in balanced suspension traction and will be in traction for several weeks before the extremity can be cast. He is in the 4th grade at school and plays soccer and basketball.

NURSING DIAGNOSIS

Risk for Peripheral Neurovascular Dysfunction related to fracture or effects of traction

GOAL: The child will maintain circulation and normal neurovascular status in extremities.

EXPECTED OUTCOMES

- The child's pulse rate is within a normal range with adequate pulses and capillary refill in all extremities.
- The child has good skin color and temperature, appropriate movement and sensation in all extremities.

NURSING INTERVENTIONS

RATIONALE

<p>Maintain proper body alignment with traction weights and pulleys hanging free of bed and off the floor.</p> <p>Monitor pulses in right leg and compare to pulses in other extremity.</p> <p>Monitor skin in extremities for color, temperature, sensation, and movement.</p> <p>Record and report any change in neurovascular status.</p>	<p>Body alignment must be maintained to prevent permanent injury or disalignment and decreased range of motion in effected extremity.</p> <p>Comparison helps to determine if circulation is adequate in affected extremity.</p> <p>Any change in neurovascular status could indicate impaired nerve function.</p> <p>Immediate reporting leads to rapid treatment and decreases likelihood of long-term damage.</p>
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NURSING DIAGNOSIS

Impaired Skin Integrity related to abrasions
 High Risk for Impaired Skin Integrity related to immobility

GOAL: The child will exhibit healed skin abrasions and no further skin breakdown.

EXPECTED OUTCOMES

- The child's skin abrasions heal without signs or symptoms of infection.
- The child's skin remains intact without redness or irritation.

NURSING INTERVENTIONS

RATIONALE

<p>Wash and thoroughly dry skin every day.</p> <p>Inspect skin at least every 4 hours for evidence of redness or broken skin.</p> <p>Change position every 2 hours within restraints of traction.</p> <p>Clean pin sites as ordered following standard precautions.</p> <p>Observe for redness, drainage at pin sites, and elevated temperature.</p>	<p>Stimulates circulation and keeps skin clean</p> <p>Allows early detection and treatment of skin breakdown, which can prevent long-term complications</p> <p>Relieves pressure and decreases likelihood of skin breakdown and decreased circulation</p> <p>Decreases risk of infection</p> <p>Identifies signs and symptoms of possible infection</p>
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NURSING DIAGNOSIS

Activity Intolerance related to skeletal traction and bed rest

GOAL: The child will maintain adequate range of motion.

EXPECTED OUTCOMES

- The child performs range of motion within limits of traction.
- The child does own self-care activities.
- The child participates in age-appropriate activities within restrictions of traction.

(nursing care plan continues on page 38)

NURSING CARE PLAN 23.1 continued

The Child in Traction

NURSING INTERVENTIONS

Teach child active and passive range-of-motion exercises.
Encourage child to become active in self-care.

RATIONALE

Maintains joint function and exercises circulation
Provides a feeling of control over hospitalization; increases use of parts of body not immobilized to allow normal muscle function

NURSING DIAGNOSIS

Deficient Diversional Activity related to lengthy hospitalization

GOAL: The child will achieve developmental tasks appropriate for age.

EXPECTED OUTCOMES

- The child selects and participates in age-appropriate activities and play.
- The child shows enjoyment in participating in activities.
- The child communicates and interacts with peers.

NURSING INTERVENTIONS

Provide age-appropriate games, supplies, and activities that the child can do while in traction such as books, puzzles, computer games.
Encourage child to communicate with peers by telephone, letter, computer.
Move child's bed to hallway or playroom to enable participation in activities.

RATIONALE

Permits access to age-appropriate activities to help the child develop and achieve milestones of growth and development
Allows for normal growth and development opportunities
Increases interaction with other children; decreases boredom

(15,000 to 25,000 cells or more), an increased ESR, and positive blood cultures. Radiographic examination does not reveal the process until 5 to 10 days after the onset.

Treatment

Treatment for acute osteomyelitis must be immediate. IV antibiotic therapy is started at once and continued for at least 6 weeks. Depending on the physician and the compliance of the child and family, a short course of IV antibiotics may be followed by administration of oral antibiotics to complete treatment. Surgical drainage of the involved metaphysis may be performed. If the abscess has ruptured into the subperiosteal space, chronic osteomyelitis follows.

If prompt specific antibiotic treatment is vigorously used, acute osteomyelitis may be brought under control rapidly and extensive bone destruction of chronic osteomyelitis is prevented. If extensive destruction of bone has occurred before treatment, surgical removal of necrotic bone becomes necessary.

Nursing Care

During the acute stage nursing care includes reducing pain by positioning the affected limb, minimizing movement of the limb, and administering medication.

Nursing judgment is in order.



In children with osteomyelitis, transmission-based precautions may be required if a wound is open and draining.

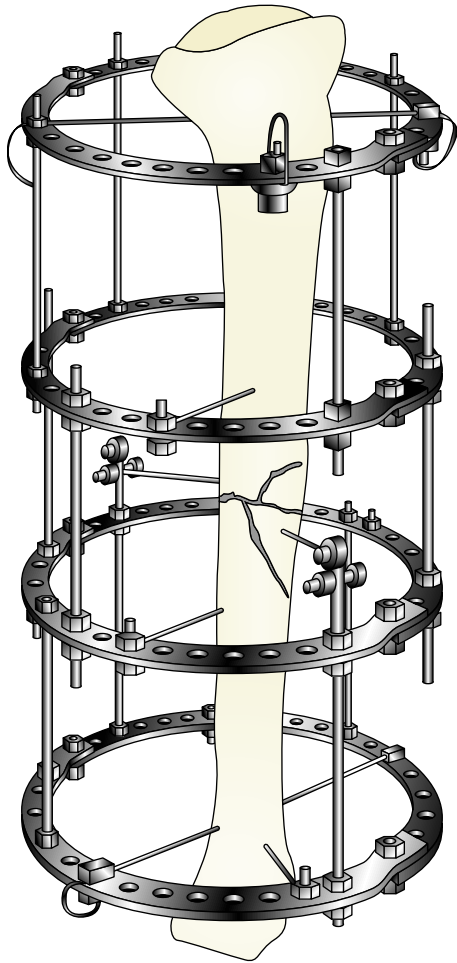
The usual procedure for IV antibiotic therapy is followed, including careful observance of the venipuncture site and monitoring of the rate, dosage, and time of antibiotic administration.

An intermittent infusion device or peripherally inserted central catheter may be used for long-term IV therapy.

Monitor oral nutrition and fluids because the child's appetite may be poor during the acute phase and may improve in later stages. Weight bearing on the affected limb must be avoided until healing has occurred because pathologic fractures occur very easily in the weakened stage. Physical therapy helps restore limb function.

Muscular Dystrophy

Muscular dystrophy is a hereditary, progressive, degenerative disease of the muscles. The most common form of muscular dystrophy is Duchenne (pseudohy-



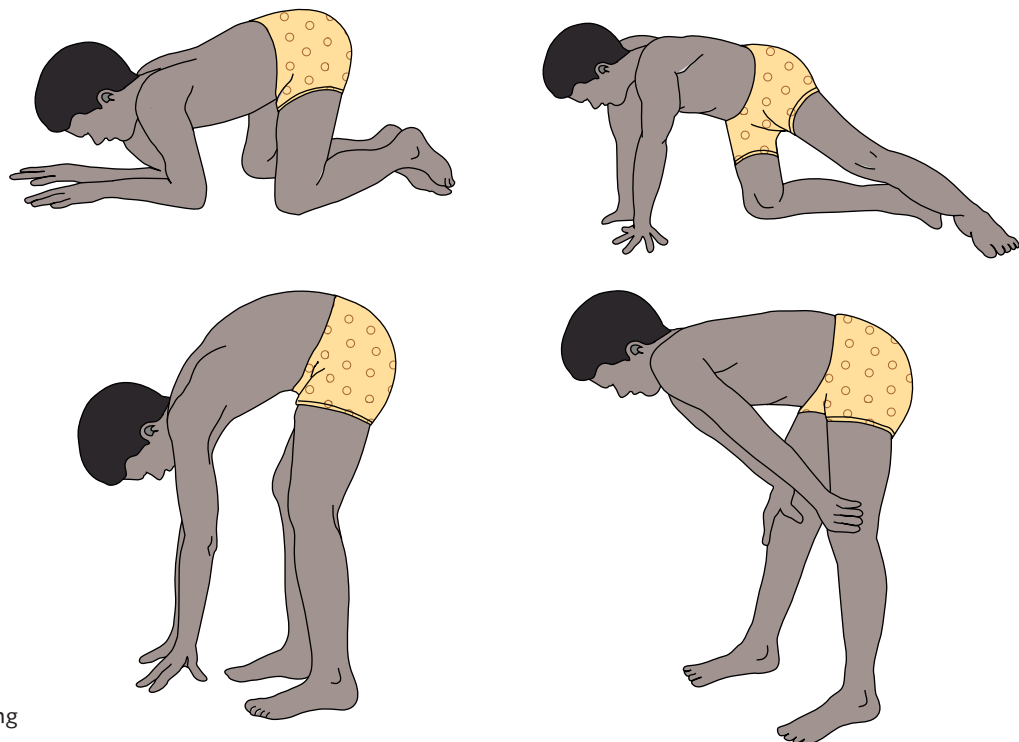
● **Figure 23.13** External fixation device.

perrophic) muscular dystrophy. Duchenne muscular dystrophy, an X-linked recessive hereditary disease, occurs almost exclusively in males. Females usually are carriers of the disease. When muscular dystrophy has been diagnosed in a child, the mother and the siblings should be tested to see whether they have the disease or are carriers.

Clinical Manifestations and Diagnosis

The first signs are noted in infancy or childhood, usually within the first 3 to 4 years of life. The child has difficulty standing and walking, and later trunk muscle weakness develops. Mild mental retardation often accompanies this disease. The child cannot rise easily to an upright position from a sitting position on the floor; instead, he or she rises by climbing up the lower extremities with the hands (Fig. 23-14). Weakness of leg, arm, and shoulder muscles progresses gradually. Increasing abnormalities in gait and posture appear by school age, with **lordosis** (forward curvature of the lumbar spine or swayback), pelvic waddling, and frequent falling (Fig. 23-15). The child becomes progressively weaker, usually becoming wheelchair-bound by 10 to 12 years of age (middle school or junior high school age). The disease continues into adolescence and young adulthood, when the patient usually succumbs to respiratory or heart failure.

In addition to symptoms in the first 2 years of life, highly increased serum creatinine phosphokinase levels, as well as a decrease in muscle fibers seen in a muscle biopsy, can confirm the diagnosis.



● **Figure 23.14** Child "climbing up" lower extremities.



● **Figure 23.15** Characteristic posture of a child with Duchenne muscular dystrophy. Along with the typical toe gait, the child develops a lordotic posture as Duchenne dystrophy causes further deterioration.

Treatment and Nursing Care

No effective treatment for the disease has been found, but research is rapidly closing in on genetic identification, which promises exciting changes in treatment in the future. The child is encouraged to be as active as possible to delay muscle atrophy and contractures. To help keep the child active, physiotherapy, diet to avoid obesity, and parental encouragement are important.

When a child becomes wheelchair-bound, **kyphosis** (hunchback) develops and causes a decrease in respiratory function and an increase in the incidence of infections. Breathing exercises are a daily necessity for these children.

The nurse should advise the family to keep the child's life as normal as possible, which may be difficult. This disease can drain the emotional and financial reserves of the entire family. The nurse might suggest assistance through the Muscular Dystrophy Association—USA (National Headquarters, 3300 E. Sunrise Drive, Tucson, AZ 85718; 800-572-1717; website: <http://www.mdausa.org>), through local chapters of this organization, and by talking with other parents who face the same problem.

Legg-Calvé-Perthes Disease (Coxa Plana)

Legg-Calvé-Perthes disease is an aseptic necrosis of the head of the femur. It occurs four to five times more

often in boys than in girls and 10 times more often in whites than in other ethnic groups. It can be caused by trauma to the hip, but generally the cause is unknown.

Clinical Manifestations and Diagnosis

Symptoms first noticed are pain in the hip or groin and a limp accompanied by muscle spasms and limitation of motion. These symptoms mimic **synovitis** (inflammation of a joint, which is most commonly the hip in children), which makes immediate diagnosis difficult. Radiographic examination may need to be repeated several weeks after the initial visit to demonstrate vascular necrosis for a definitive diagnosis.

There are three stages of the disease; each lasts 9 months to 1 year. In the first stage, radiographic studies show opacity of the epiphysis. In the second stage, the epiphysis becomes mottled and fragmented; during the third stage, reossification occurs.

Treatment and Nursing Care

In the past, immobilization of the hip through the use of braces and crutches and bed rest with traction or casting was considered essential for recovery without deformity. However, restricting a child's activity for 2 years or more was extremely difficult. Current treatment focuses on containing the femoral head within the acetabulum during the revascularization process so that the new femoral head will form to make a smoothly functioning joint. The method of containment varies with the portion of the head affected. Use of a brace that holds the necrotic portions of the head in place during healing is considered an effective method of containment. Reconstructive surgery is now possible, enabling the child to return to normal activities within 3 to 4 months.

The prognosis for complete recovery without difficulty later in life depends on the child's age at the time of onset, the amount of involvement, and the cooperation of the child and the family caregivers.

Nursing care focuses on helping the child and caregivers to manage the corrective device and the importance of compliance to promote healing and to avoid long-term disability.

Osteosarcoma

Osteosarcoma is a malignant tumor seen in the long bones, such as the femur, thigh, and humerus. It is more frequently seen in boys than in girls. Children who have had exposure to radiation or retinoblastoma are more prone to the malignancy.

Clinical Manifestations and Diagnosis

An injury such as a sports injury may draw attention to the pain and swelling at the site of the tumor, but

the injury itself did not cause the tumor. It is important to explain this to the child and caregiver to decrease their possible feelings of guilt. Pathologic fractures of the bone can occur.

A biopsy, as well as radiography, bone scan, computed tomography (CT), and magnetic resonance imaging (MRI), confirm the diagnosis. Metastasis to the lungs can occur.

Treatment and Nursing Care

Surgical removal of the bone or the limb followed by chemotherapy is the treatment for the tumor. A prosthesis is fitted, often soon after the surgery.

A cancer diagnosis is frightening to the child and family, and honest answers and support are helpful. After an amputation, phantom pain in the amputated extremity can be relentless. Learning to live with a prosthesis may be a long and challenging process. Support groups with other children living with a prosthetic device can be helpful. With early diagnosis and treatment, many children survive this diagnosis and live into adulthood.

Ewing's Sarcoma

Ewing's sarcoma is a malignant tumor found in the bone marrow of the long bones. It is often seen in older school-age or adolescent boys.

Clinical Manifestations and Diagnosis

As with osteosarcoma, many times an injury draws attention to the pain at the site of the tumor. The pain may be sporadic for a period of time but continues and becomes severe enough to keep the child awake at night. Metastasis to the lung and other bones may already have taken place by the time of diagnosis. A biopsy, bone scan, and bone marrow aspiration are done to further diagnose the tumor.

Treatment and Nursing Care

The tumor is removed and radiation as well as chemotherapy is given. In many cases the limb does not have to be amputated, although this may be part of the treatment.

About half of the children with Ewing's sarcoma achieve a 5-year survival rate, especially if there is no metastasis at the time of diagnosis. Adjusting to the course and effects of chemotherapy, such as hair loss, nausea, and vomiting, is difficult, and offering support and encouragement is an important role of the nurse.

Juvenile Rheumatoid Arthritis

Juvenile rheumatoid arthritis (JRA) is the most common connective tissue disease of childhood. Connective tissues are those that provide a supportive framework and protective covering for the body, such

as the musculoskeletal system and skin and mucous membranes. The occurrence of JRA appears to peak at two age levels: 1 to 3 years and 8 to 12 years. This disease has a long duration, but 85% of children with JRA reach adulthood without serious disability (Cassidy, 2006).

Clinical Manifestations

Joint inflammation occurs first; if untreated, inflammation leads to irreversible changes in joint cartilage, ligaments, and menisci (the crescent-shaped fibrocartilage in the knee joints), eventually causing complete immobility. The inflammation can be subdivided into three different types: systemic; polyarticular, involving five or more joints; and oligoarthritis (pauciarticular), involving four or fewer joints, most often the knees and the ankles (Table 23-7).

Treatment and Nursing Care

The treatment goal is to maintain mobility and preserve joint function. Treatment can include drugs, physical therapy, and surgery. Early diagnosis and drug therapy to control inflammation and other systemic changes can reduce the need for other types of treatment.

Drug Therapy. Enteric-coated aspirin has long been the drug of choice for JRA, but because of the concern of aspirin therapy and Reye syndrome (see Chapter 21), NSAIDs are being used frequently to replace aspirin in treatment of JRA. Aspirin may still be used because it is an effective anti-inflammatory drug, is inexpensive, is easily administered, and has few side effects when carefully regulated. Both aspirin and NSAIDs, such as naproxen and ibuprofen, may cause gastrointestinal irritation and bleeding.

Acetaminophen is not an appropriate substitute because it lacks anti-inflammatory properties. Teach

Here's a pharmacology fact.



Administer aspirin and NSAIDs with food or milk to decrease the side effects of gastrointestinal irritation and bleeding.

family caregivers the importance of regular administration of the medications, even when the child is not experiencing pain. The primary purpose of aspirin or NSAIDs is not to relieve pain

but to decrease joint inflammation.

When aspirin or NSAIDs are no longer effective, gold preparations, steroids, D-penicillamine, or immunosuppressives may be used. All these are toxic, and their use must be closely monitored.

Physical Therapy. Physical therapy includes exercise, application of splints, and heat. Implementing this program at home requires the cooperation of the nurse, physical therapist, and care provider. Joints

TABLE 23.7 Characteristics of Different Types of Juvenile Rheumatoid Arthritis

Sign/Symptom of Onset	Polyarthritis	Oligoarthritis (Pauciarticular)	Systemic
Frequency of cases	30%	60%	10%
Number of joints involved	5 or more	4 or fewer	Variable
Sex ratio (F:M)	3:1	5:1	1:1
Systemic involvement	Moderate	Not present	Prominent
Uveitis*	5%	5%–15%	Rare
Sensitivity			
Rheumatoid factors	10%	Rare	Rare
Antinuclear bodies	40%–50%	75%–85%	10%
Course	Systemic disease is generally mild; articular involvement may be unremitting	Systemic disease is absent; major cause of morbidity is uveitis	Systemic disease is often self-limited; arthritis is chronic and destructive in 50%
Prognosis	Guarded to moderately good	Excellent except for eyesight	Moderate to poor

*Uveitis—an inflammation of the middle (vascular) tunic of the eye: includes the iris, ciliary body, and choroide.

Adapted from Cassidy, J. T. (2006). Rheumatic disease of childhood. In *Oski's pediatrics: Principles and practice* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.

must be immobilized by splinting during active disease, but gentle daily exercise is necessary to prevent **ankylosis** (immobility of a joint). Stress to the caregivers the importance of encouraging the child to perform independent activities of daily living to maintain function and independence. The family caregiver must be patient, allowing the child time to accomplish necessary tasks.

Depending on the degree of disease, activity, range-of-motion exercises, isometric exercises, swimming, and riding a tricycle or bicycle may be part of the treatment plan. Inform caregivers that these exercises should not increase pain; if exercise does trigger increased pain, the amount of exercise should be decreased.

TEST YOURSELF

- What is the cause of osteomyelitis, and how is it treated?
- What is the most common form of muscular dystrophy (MD), and what signs are usually noted in the child with MD?
- Why is it important to treat the joint inflammation in the child with juvenile rheumatoid arthritis (JRA)?
- Which medication is given for the child with JRA?

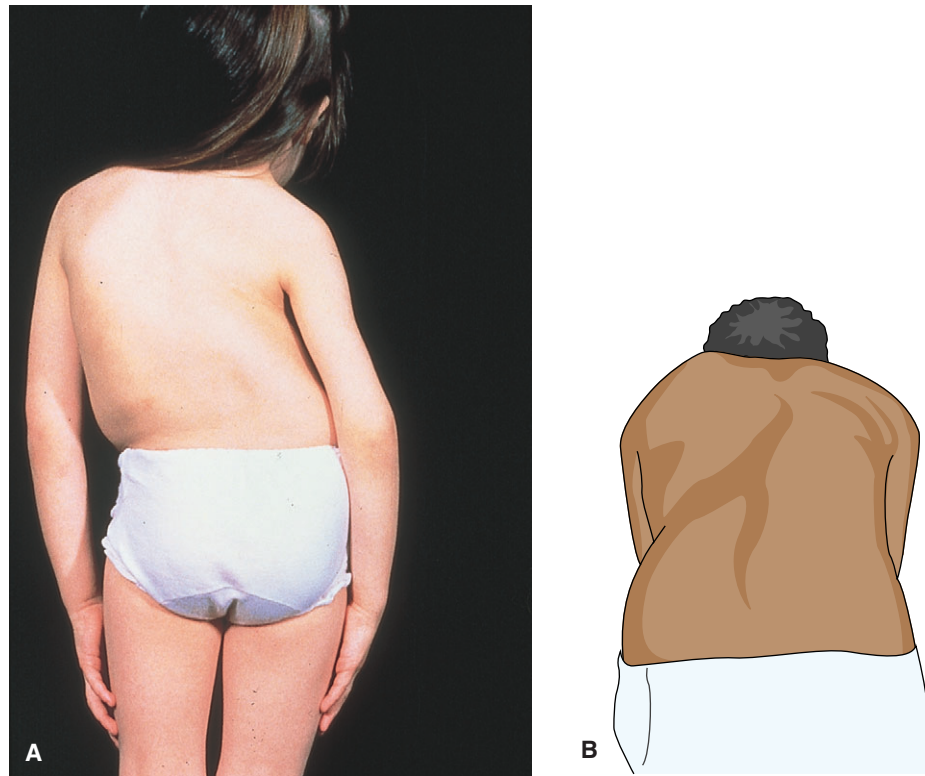
Scoliosis

Scoliosis, a lateral curvature of the spine, occurs in two forms: structural and functional (postural). Structural scoliosis involves rotated and malformed vertebrae. Functional scoliosis, the more common type, can have several causes: poor posture, muscle spasm caused by trauma, or unequal length of legs. When the primary problem is corrected, elimination of the functional scoliosis begins.

Most cases of structural scoliosis are idiopathic (no cause is known); a few are caused by congenital deformities or infection. Idiopathic scoliosis is seen in school-age children at 10 years of age and older. Although mild curves occur as often in boys as in girls, idiopathic scoliosis requiring treatment occurs eight times more frequently in girls than in boys (Sponseller, 2006).

Diagnosis

Diagnosis is based on a screening examination. Many states require regular examination of students for scoliosis, beginning in the fifth or sixth grade. Scoliosis screening should last through at least eighth grade. Nurses play an important role in screening for this disorder. School nurses and others who work in health care settings with children aged 10 years and older should conduct or assist with screening programs. A school nurse often does the initial screening. Nurses in other health care settings are responsible for further screening of these children during regular well-child visits.



● **Figure 23.16** (A) Posterior view of child's back with lateral curvature. (B) View of child bending over with prominence of scapular area and asymmetry of flank demonstrated.

During examination, observe the undressed child from the back and note any lateral curvature of the spinal column; asymmetry of the shoulders, shoulder blades, or hips; and an unequal distance between the arms and waist (Fig. 23–16). The examiner then asks the child to bend at the hips (touch the toes) and observes for prominence of the scapula on one side and curvature of the spinal column (see Chapter 22).

Treatment

Treatment depends on many factors and is either nonsurgical or surgical. Treatment is long term and often lasts through the rest of the child's growth cycle.

Curvatures of less than 25 degrees are observed but not treated. Electrical stimulation, a type of nonsurgical treatment, may be used for mild curvatures, but its effectiveness is unclear. Other nonsurgical treatment includes the use of braces or traction. Curvatures between 25 degrees and 40 degrees are usually corrected with a brace. More severe curvatures may be treated with traction.

Curvatures of more than 40 degrees are usually corrected surgically. Surgical treatment includes the use of rods, screws, hooks, and spinal fusion.

Electrical Stimulation. Electrical stimulation may be used as an alternative to bracing for the child with a mild to moderate curvature. Electrodes are applied to the skin or surgically implanted. Treatment occurs

at night while the child is asleep. The leads are placed to stimulate muscles on the convex side of the curvature to contract as impulses are transmitted. This causes the spine to straighten. If external electrodes are used, the skin under the leads must be checked regularly for irritation. This treatment is the least disruptive to the child's life, but there is some controversy about its effectiveness.

Braces. The Milwaukee brace was the first type of brace used for scoliosis but is now more commonly used to treat kyphosis, an abnormal rounded curvature of the spine that is also called humpback. Either the Boston brace or the TLSO brace is more commonly used to treat scoliosis (Fig. 23–17). The Boston brace and the TLSO brace are made of plastic and are customized to fit the child.

The brace should be worn constantly, except during bathing or swimming, to achieve the greatest benefit. It is worn over a T-shirt or undershirt to protect the skin. The fit of the device is monitored closely, and the child and caregiver should be taught to notify the health care provider if there is any rubbing. During the first couple weeks of wearing the brace the child can be given a mild analgesic for discomfort and aching. The child's provider may also prescribe certain exercises to be done several times a day. These are taught before the brace is applied but are done while the brace is in place.



● **Figure 23.17** A girl with scoliosis being fitted with a TLSO brace for treatment.

Traction. When a child has a severe spinal curvature or cervical instability, a form of traction known as **halo traction** (Fig. 23–18) may be used to reduce spinal curves and straighten the spine. Halo traction is achieved by using stainless steel pins inserted into the skull while counter-traction is applied by using pins inserted into the femur. Weights are increased gradually to promote correction. When the curvature has been corrected, spinal fusion is performed. In some cases halo traction might be used after surgery if there is cervical instability.

The strange appearance of the halo traction apparatus magnifies the problems of body image; in addition, the head may need to be shaved. The child needs a thorough explanation of what will occur during the procedure and should be given the opportunity to talk about his or her feelings. Frequent shampooing, cleansing of the pin sites, and observation for signs of complications are critical for the child in halo traction.

Surgical Treatment. Various types of instruments such as rods, screws, and hooks may be placed along

the spinal column to realign the spine, and then spinal fusion is performed to maintain the corrected position. This procedure, which is done in cases of severe curvatures, is frightening to the child and family. It is major surgery, and the child and family must be well prepared for it. Because this is an elective procedure, thorough preoperative teaching can be carried out for the child and the family. The child can expect to have postoperative pain and will have to endure days of remaining flat in bed, being turned only in a logrolling fashion (Fig. 23–19). After surgery, the neurovascular status of the extremities is monitored closely. The child may be given a patient-controlled analgesia pump to control pain. An indwelling urinary (Foley) catheter is usually inserted because of the need for the patient to remain flat. The rods remain in place permanently. In some cases the child may be placed in a body cast for a period of time to ensure fusion of the spine. About 6 months after surgery, the child can take part in most activities, except contact sports (such as tackle football, gymnastics, and wrestling). Because the bones are fused and rods are implanted, this procedure arrests the child's growth in height, which contributes to the emotional adjustment that the child and family must make.

● Nursing Process for the Child With Scoliosis Requiring a Brace

ASSESSMENT

The child with scoliosis must be reassessed every 4 to 6 months. Document the degree of curvature and related impairments. Scoliosis often is diagnosed in late school age or early adolescence. This is a sensitive age for children, when privacy and the importance of being like everyone else are top priorities. Keep this in mind



● **Figure 23.18** A 9-year-old girl in halo traction.



● **Figure 23.19** Two nurses use a draw-sheet to logroll the child to a side-lying position.

when interviewing and during examination of the child. Provide privacy and protect the child's modesty.

The child who is admitted to a health care facility for application of a brace or other instrumentation may be carrying a lot of unseen emotional baggage. Be sensitive to this emotional state. The family caregivers also may be upset but trying to hide it for the child's sake. In addition to routine observations, look for clues to the emotional state of both the child and family caregivers.

SELECTED NURSING DIAGNOSES

- Impaired Physical Mobility related to restricted movement
- Risk for Injury related to decreased mobility
- Risk for Impaired Skin Integrity related to irritation of brace
- Risk for Disturbed Body Image related to wearing a brace continuously
- Risk for Noncompliance related to long-term treatment

OUTCOME IDENTIFICATION AND PLANNING

Consult the child and caregiver when establishing patient goals. Be especially sensitive to the child's needs. Goals for the child may include minimizing the disruption of activities, preventing injury, and maintaining skin integrity and self-image. Goals for the child and caregiver include complying with long-term care.

IMPLEMENTATION

Promoting Mobility

Prescribed exercises must be practiced and performed as directed. Encourage and support the child during these exercises. The child may need to be in traction for 1 or 2 weeks before the brace is applied. Encourage the child to perform exercises as directed. This can help to minimize the risks of immobility and promote self-esteem.

Preventing Injury

Evaluate the child's environment after the brace has been applied and take precautions to prevent injury. Help the child practice moving about safely: going up and down stairs; getting in and out of vehicles, chairs, and desks; and getting out of bed. Teach the child to avoid hazardous surfaces. Listen carefully to the child and the family caregiver to determine any other hazards in the home or school environment. Advise the family caregiver to contact school personnel to ensure that the child has comfortable, supportive seating at school and that adjustments are made in the physical education program.

Preventing Skin Irritation

When the brace is first applied, check the child regularly to confirm proper fit. Observe for any areas of rubbing, discomfort, or skin irritation and adjust the brace as necessary. Teach the child how to inspect all areas under the brace daily. Instruct the child and caregiver that reddened areas should be reported to the care provider so that adjustments can be made. Skin under the pads should be massaged daily. Daily bathing is essential, and clean cotton underwear or a T-shirt should be worn under the brace to provide protection.

Promoting Positive Body Image

The child should be involved in all aspects of care planning. Self-image and the need to be like others are very important at this age. Wearing a brace creates a distinct change in body image, especially in the older school-age child or adolescent at a time when body consciousness is at an all-time high. Clothing choices are a challenge when wearing a brace.

Acceptance is important.



Wearing clothing similar to what peers are wearing helps the child with scoliosis to feel more accepted.

Wearing clothing similar to what peers are wearing helps the child with scoliosis to feel more accepted.

The need to wear the brace and deal with the limitations it involves may cause anger; the change in body image can cause a grief reaction. Handling these feelings successfully requires understanding support from the nurse, family, and peers. It is important for the child to have an opportunity to talk about his or her feelings. Sometimes it is helpful for the patient in a brace to talk with other scoliosis patients and learn how they have coped. Understanding the disorder itself and the important benefits of treatment also can ease the adjustment.

Learning to be confident enough to handle the comments of peers can be difficult for the child. Give the child frequent opportunities to ventilate feelings about being different. Help the child select clothing that blends with current styles but is loose enough to hide the brace. Encourage the child to find extracurricular activities with which the brace will not interfere. Active sports are not permitted, but many other activities are available. Help the child focus and enhance a positive attribute about characteristics such as hair or complexion. Encourage the child and caregiver to discuss accommodations with school personnel together.

Promoting Compliance With Therapy

The child must wear the brace for years until the spinal growth is completed. Then the child needs to be weaned from it gradually for another 1 or 2 years by wearing it only at night. During this period the care-

givers and the child need emotional support from health care personnel. Be certain that the child and caregivers have a complete understanding of the importance of wearing the brace continually. To encourage compliance, teach them about possible complications of spinal instability and possible further deformity if correction is unsuccessful. Inform the caregiver about the need to monitor the child for compliance. Help the caregiver understand the importance of being empathic to the child's need to be like others during this period of development. Offer ways in which the caregiver can help the child deal with adjustment to the therapy.

EVALUATION: GOALS AND EXPECTED OUTCOMES

- **Goal:** The child will move effectively within the limits of the brace.
Expected Outcome: The child ambulates and participates in daily activities.
- **Goal:** The child will remain free from injury while in the brace.
Expected Outcome: The child demonstrates safe practices related to everyday activities at home and in the school environment.
- **Goal:** The child's skin will remain intact.
Expected Outcomes: The child uses methods to reduce skin irritation and bathes regularly. Skin remains free from irritation and breakdown.
- **Goal:** The child will exhibit positive coping behaviors.
Expected Outcomes: The child is self-confident, has an attractive well-groomed appearance, and verbalizes feelings about the need to wear the brace.
- **Goal:** The child will comply with therapy.
Expected Outcome: The child wears the brace as directed. Caregivers report compliance, and the child's condition shows evidence of compliance.

TEST YOURSELF

- Explain the difference between structural and functional scoliosis.
- When should screening for scoliosis be started? What is the procedure for scoliosis screening?
- What are the ways scoliosis can be treated?

INTEGUMENTARY DISORDERS

School-age children often have minor bruises, abrasions, or rashes that generally cause few problems. Some common fungal and parasitic disorders, however, can become serious if not controlled and cured.

Fungal Infections

Fungi that live in the outer (dead) layers of the skin, hair, and nails can develop into superficial infections. **Tinea** (ringworm) is the term commonly applied to these infections, which are further differentiated by the part of the body infected.

TINEA CAPITIS (RINGWORM OF THE SCALP)

Ringworm of the scalp is called tinea capitis or tinea tonsurans. The most common cause is infection with *Microsporum audouinii*, which is transmitted from person to person through combs, towels, hats, barber scissors, or direct contact. A less common type, *Microsporum canis*, is transmitted from animal to child.

Clinical Manifestations

Tinea capitis begins as a small papule on the scalp and spreads, leaving scaly patches of baldness. The hairs become brittle and break off easily.

Treatment and Nursing Care

Griseofulvin, an oral antifungal, is the medication of choice. Because treatment may be prolonged (3 months or more), compliance must be reinforced. Be sure that parents and children understand the medication therapy. Children who are properly treated may attend school. Advise the child and parents that hair loss is not permanent.

TINEA CORPORIS (RINGWORM OF THE BODY)

Tinea corporis is ringworm of the body that affects the epidermal skin layer. The child usually contracts tinea corporis from contact with an infected dog or cat.

The lesions appear as a scaly ring with clearing in the center, occurring on any part of the body. They resemble the lesions of scalp ringworm. Topical antifungal agents, such as clotrimazole, econazole nitrate, tolnaftate, and miconazole, are effective. Griseofulvin also is used to treat this condition.

TINEA PEDIS

Tinea pedis, ringworm of the feet, is more commonly known as athlete's foot. It is evidenced by the scaling or cracking of the skin between the toes. Transmission is by direct or indirect contact with skin lesions from infected people. Contaminated sidewalks, floors, pool decks, and shower stalls spread the condition to those

who walk barefoot. Tinea pedis, usually found in adolescents and adults, is becoming more prevalent among school-age children because of the popularity of plastic shoes. Examination under a microscope of scrapings from the lesions is necessary for definite diagnosis.

Care includes washing the feet with soap and water and then gently removing scabs and crusts and applying a topical agent such as tolnaftate. Griseofulvin by mouth is also useful. During the chronic phase the use of ointment, scrupulous foot hygiene, frequent changing of white cotton socks, and avoidance of plastic footwear are helpful. Application of a topical agent for as long as 6 weeks is recommended.

TINEA CRURIS

Tinea cruris, more commonly known as jock itch, or ringworm of the inner thighs and inguinal area, is caused by the same organisms that cause tinea corporis. It is more common in athletes and is uncommon in preadolescent children. Tinea cruris is pruritic and localized to the area. Treatment is the same as for tinea corporis. Sitz baths also may be soothing.

TEST YOURSELF

- How is ringworm of the scalp, tinea capitis, usually transmitted?
- Which classification of medication is given to treat ringworm?

Parasitic Infections

Parasites are organisms that live on or within another living organism from which they obtain their food supply. Lice and the scabies mite live by sucking the blood of the host.

PEDICULOSIS

Pediculosis (lice infestation) may be caused by *Pediculus humanus capitis* (head lice), *Pediculus humanus corporis* (body lice), or *Pthirus pubis* (pubic lice). Head lice are the most common infestation in children. Animal lice are not transferred to humans.

Head lice are passed from child to child by direct contact or indirectly by contact with combs, head gear, or bed linen.

Clinical Manifestations

Lice, which are rarely seen, lay their eggs, called nits, on the head where they attach to hair strands. The nits can be seen as tiny pearly white flecks attached to the hair shafts. They look much like dandruff, but

Don't forget the importance of your observation skills. Severe



itching of the scalp is the most obvious symptom in cases of head lice.

dandruff flakes can be flicked off easily, whereas the nits are tightly attached and not easily removed. The nits hatch in about 1 week, and the lice become sexually mature in about 2 weeks.

Treatment and Nursing Care

Nonprescription medications are available to treat cases of head lice. Products such as Pronto, RID, and A-200 contain pyrethrins, which are extracts from the chrysanthemum flower. Permethrin (Nix) may also be used. These medications are safe and usually effective in killing the lice. A second treatment is suggested in 7 to 10 days to kill the nits after they have hatched. If over-the-counter preparations do not effectively kill the lice, prescription medications may be used. Malathion (Ovide) is effective in treating lice and nits. Few side effects have been reported, but if used on open sores it may cause the skin to sting, so it should not be used if the head has been scratched. Lindane (Kwell) shampoo has been one of the most commonly used treatments for many years and is usually safe. Overuse, misuse, or accidentally swallowing of Lindane can be toxic to the brain and nervous system, so its use is suggested only in cases that do not respond to other treatments.

After the hair is wet with warm water, the medication is applied like any ordinary shampoo; about 1 oz is used. The head should be lathered for several minutes, following the directions on the label for each specific medication, and then rinsed thoroughly and dried. After the hair is dry, it should be combed with a combing tool such as a LiceMeister or a fine-toothed comb dipped in warm white vinegar to remove remaining nits and nit shells. Shampooing may be repeated in 2 weeks to remove any lice that may have been missed as nits and since hatched. Avoid getting medication into the eyes or on mucous membranes. When treating a child in the hospital for pediculosis, wear a disposable gown, gloves, and head cover for protection.

Family caregivers are often embarrassed when the school nurse sends word that the child has head lice. They can be reassured that lice infestation is common and can happen to any child; it is not a reflection on the caregiver's housekeeping. All family members should be inspected and treated as needed. See Family Teaching Tips: Eliminating Pediculi Infestations for other useful information.

SCABIES

Scabies is a skin infestation caused by the scabies mite *Sarcoptes scabiei*. The female mite burrows in areas between the fingers and toes and in warm folds of the body, such as the axilla and groin, to lay eggs.

Clinical Manifestations

Burrows are visible as dark lines, and the mite is seen as a black dot at the end of the burrow. Severe itching occurs, causing scratching with resulting secondary infection.

Treatment and Nursing Care

The body, except for the face, is treated with permethrin cream (Elimite) or lindane lotion. The directions for each medication should be followed closely. The body is first scrubbed with soap and water, and then the lotion is applied on all areas of the body except the face. Permethrin is the preferred treatment because of the decreased risk of neurologic problems. It is usually left on the skin for 8 to 14 hours. With lindane, the medication is left on for 8 to 12 hours and then completely washed off with warm water.

Caregivers should follow the tips recommended for pediculosis. All who had close contact with the child within a 30- to 60-day period should be treated. The rash and itch may continue for several weeks even though the mites have been successfully eliminated.

TEST YOURSELF

- Explain what pediculosis is and at what sites it is frequently found in children.
- How is pediculosis treated?
- Why is it important for the child with scabies to avoid scratching involved areas?

Allergic Disorders

Millions of Americans have allergic diseases, most of which begin in childhood. Children with allergies are hampered because of poor appetites, poor sleep, and restricted physical activity in play and at school, all of which often result in altered physical and personality development. Children whose parents or grandparents have allergies are more likely to become allergic than are other children. An allergic condition is caused by sensitivity to a substance called an **allergen** (an antigen that causes an allergy). Thousands of allergens exist. Some of the most common are

FAMILY TEACHING TIPS**Eliminating Pediculi Infestations**

- Wash all child's bedding and clothing in hot water and dry in hot dryer.
- Vacuum carpets, car seats, mattresses, and upholstered furniture very thoroughly. Discard vacuum dust bag.
- Wash pillows, stuffed animals, and other washable items the same way clothing is washed.
- Dry clean nonwashable items.
- If items cannot be washed or dry cleaned, seal in plastic bag for 2 weeks to break the reproductive cycle of lice.
- Wash combs, brushes, and other hair items (rollers, curlers, barrettes, etc.) in shampoo and soak for 1 hour.
- If you discover the infestation, report to child's school or day care.
- Have school personnel disinfect headphones.

- Pollen
- Mold
- Dust
- Animal dander
- Insect bites
- Tobacco smoke
- Nuts
- Chocolate
- Milk
- Fish
- Shellfish

Drugs, particularly aspirin and penicillin, can be allergens as well. Some plants and chemicals cause allergic reactions on the skin. Allergens may enter the body through various routes, the most common being the nose, throat, eyes, skin, digestive tract, and bronchial tissues in the lungs. The first time the child comes in contact with an allergen, no reaction may be evident, but an immune response is stimulated—helper lymphocytes stimulate B lymphocytes to make immunoglobulin E (IgE) antibody. The IgE antibody attaches to mast cells and macrophages. When contacted again, the allergen attaches to the IgE receptor sites, and a response occurs in which certain substances, such as histamine, are released; these substances produce the symptoms known as allergy.

Diagnosis of an allergy requires a careful history and physical examination and possibly skin and blood tests, including a complete blood count, serum protein electrophoresis, and immunoelectrophoresis. Skin testing is generally done when removal of obvious allergens is impossible or has not brought relief. If a

Be careful. The caregivers of a child allergic to peanuts must always read labels of food products. They will find many unsuspecting products contain peanuts or peanut oil.



food allergy is suspected, an elimination diet may help identify the allergen. Eliminating the food suspected is sometimes difficult because there are often “hidden” ingredients in food products.

When specific allergens have been identified, patients can either avoid them or, if this is impossible, undergo immunization therapy by injection. This process is called **hyposensitization** or immunotherapy.

Hyposensitization is performed for the allergens that produce a positive reaction on skin testing. The allergist sets up a schedule for injections in gradually increasing doses until a maintenance dose is reached. The patient should remain in the physician’s office for 20 to 30 minutes after the injection in case any reaction occurs. Reactions are treated with epinephrine. Severe reactions in children are uncommon, and hyposensitization is considered a safe procedure with considerable benefit for some children.

Symptomatic relief in allergic reactions can be gained through antihistamine or steroid therapy, but the best treatment is prevention.

SKIN ALLERGIES

Skin disorders of allergic origin include hives (urticaria) and giant swellings (angioedema) and rashes caused by poison ivy, poison oak, and other plants or drug reactions. Skin rashes are common in children. Infectious diseases cause some, and allergies cause others. Whatever the cause, rashes are usually treated with topical preparations, such as lotions, ointments, and greases, plus cool soaks. The itching must be relieved as much as possible because scratching can introduce additional pathogens to the affected area.

Clinical Manifestations

Hives appear in different sizes on many different parts of the body and are usually caused by foods or drugs. They are bright red and itchy and can occur on the eyelids, tongue, mouth, hands, feet, or in the brain or stomach. When affecting the mouth or tongue, hives can cause difficulty in breathing; in the stomach the swelling can produce pain, nausea, and vomiting. Swelling in brain tissue causes headache and other neurologic symptoms.

Foods such as chocolate, nuts, shellfish, berries or other raw fruit, fish, and highly seasoned foods are

likely to cause hives. Possible drug allergens include aspirin and related drugs, laxatives, anti-inflammatory drugs, tranquilizers, and antibiotics (penicillin is the most common allergen of this group). Sometimes it is impossible to identify the cause.

Treatment

Treatment is aimed at reducing the swelling and relieving the itching. If the allergen can be identified, it can be removed from the child’s environment and hyposensitization can be performed. If the allergen is a certain food, that food must be eliminated from the child’s diet. Antihistamines (topical or systemic) are used to relieve itching and reduce swelling. Cool soaks also help to relieve itching. Fingernails should be kept short and clean. In severe cases corticosteroids may be necessary.

PLANT ALLERGIES

Poison ivy, oak, and sumac are common causes of contact dermatitis. Of these, poison ivy is the worst offender, particularly during the summer (Fig. 23–20). The cause of the allergy is the extremely potent oil, urushiol, which is present in all parts of these plants.

Clinical Manifestations

Effects of plant allergies vary from slight inflammation and itching to severe extensive swelling that can virtually immobilize the child. This disorder causes intense itching (pruritus) and forms tiny blisters that weep and continue to spread the inflammation.

Treatment

Antihistamines or oral corticosteroids help to relieve itching and prevent scratching. Cool soaks, Aveeno baths, calamine lotion, or topical corticosteroids help minimize discomfort. The child should be taught to recognize and avoid the poisonous plants. The plants



● **Figure 23.20** Poison ivy on a child’s hand.

also should be removed from the environment when possible.

Bites

Because children are active, inquisitive, and not completely inhibited in their actions, they commonly experience animal and human bites and insect stings and bites. Many of these are minor, particularly if the skin is not broken.

ANIMAL BITES

Children enjoy pets, but often they are not alert to possibly dangerous encounters with pets or wild animals. Dog bites are common. Fortunately, because

Pay attention. Some bites can have life-threatening implications if proper care is not given.



of rabies vaccination programs for dogs, few dog bites cause rabies; in fact, cats are the domestic animal most likely to carry rabies.

Any pet that bites should be held until it can be determined if the animal has been vaccinated against rabies. If not, the child must undergo a series of injections to prevent this potentially fatal disease. The series consists of both active and passive immunizations. Active immunity is established with five injections of human diploid cell vaccine beginning on the day of the bite and on days 3, 7, 14, and 28. Human rabies immune globulin is given on the first day, along with the diploid cell vaccine.

All animal and human bites should be thoroughly washed with soap and water. An antiseptic such as 70% alcohol or povidone-iodine should be applied after the wound has been thoroughly rinsed. The wound must be observed for signs of infection until well healed. Animal bites should be promptly reported to the proper authorities.

Children should be taught at an early age about the danger of animal bites, particularly of strange or wild animals such as skunks, raccoons, bats, and squirrels.

SPIDER BITES

Spider bites can cause serious illness if untreated. Bites of black widow spiders, brown recluse spiders, and scorpions demand medical attention. Applying ice to the affected area until medical care is obtained can slow absorption of the poison.

TICK BITES

Wood ticks carried by chipmunks, ground squirrels, weasels, and wood rats can cause Rocky Mountain spotted fever. Most cases are found in the south Atlantic, south central, and southeastern United

States. Dogs are often the carriers to humans. People living in areas where ticks are common can be immunized against this disease.

Deer ticks, carried by white-footed mice and white-tailed deer, can carry the organism that causes Lyme disease. Most cases of Lyme disease in the United States have been seen in northeastern, mid-Atlantic, and upper north central regions and in some northwestern counties of California. The first stage of the disease begins with a lesion at the site of the bite. The lesion appears as a macule with a clear center. The second stage occurs several weeks to months later if the patient is not treated. The symptoms of this stage may affect the central nervous system and the heart. If untreated, the third stage may occur months to years later, causing arthritis, neurologic disorders, and bone and joint disease.

Children and adults should wear long pants, long-sleeved shirts, and insect repellent when walking in the woods. Pant legs should be tucked into socks. If a tick is found on the body, alcohol may be applied and the tick carefully removed with tweezers. To prevent the release of pathogenic organisms, care should be taken not to crush the tick. A health care provider must be consulted if there is any suspicion that a deer tick has bitten a child or an adult.

SNAKE BITES

Snake bites demand immediate medical intervention. The wound should be washed, ice applied, and the involved body part immobilized. Prompt transport to the nearest medical facility is essential.

INSECT STINGS OR BITES

Insect stings or bites can prove fatal to children who are sensitized. Swelling may be localized or may include an entire extremity. Circulatory collapse, airway obstruction, and anaphylactic shock can cause death within 30 minutes if the child is untreated. Immediate treatment is necessary and may include injection of epinephrine, antihistamines, or steroids. These children should wear a MedicAlert bracelet and carry an anaphylaxis kit that includes a plastic syringe of epinephrine and an antihistamine. The teacher, school nurse, and anyone who cares for the child should be alerted to the child's allergy and should know where the anaphylaxis kit is and how to use it when necessary.

PSYCHOSOCIAL DISORDERS

A number of behavioral problems are common in the school-age group. These problems can interfere with the child's socialization, education, and development.

Some of these have definite organic causes; for others, the causes are not clearly defined.

Attention Deficit Hyperactivity Disorder

Attention deficit hyperactivity disorder (ADHD), or attention deficit disorder (ADD), is a syndrome characterized by degrees of inattention, impulsive behavior, and hyperactivity. About 3% to 5% of all American school-age children have ADHD; boys are more commonly affected than are girls. The cause of the disorder is unclear: Developmental lag, biochemical disorder, and food sensitivities are all theories under consideration. The disorder affects every part of the child's life.

Clinical Manifestations

The child with ADHD may have these characteristics:

- Impulsiveness
- Easy distractibility
- Frequent fidgeting or squirming
- Difficulty sitting still
- Problems following through on instructions, despite being able to understand them
- Inattentiveness when being spoken to
- Frequent losing of things
- Going from one uncompleted activity to another
- Difficulty taking turns
- Frequent excessive talking
- Engaging in dangerous activities without considering the consequences

These children also often demonstrate signs of clumsiness or poor coordination, such as the inability to use a pencil or scissors in a child who is older than 3 or 4 years of age. No one child has all these symptoms. Although it was believed that these symptoms were resolved by late adolescence, it is now apparent that they continue into adulthood, at least for some people.

Although these children may have poor success in the classroom because of their inability to pay attention, they are not intellectually impaired. The child's poor impulse control also contributes to disciplinary problems in the classroom. Some children with ADHD may have learning disorders, such as dyslexia and perceptual deficits. The child's self-confidence can suffer from feeling inferior to the other children in the class. Special arrangements can be made to provide an educational atmosphere that is supportive for the child without the need for the child to leave the classroom.

Diagnosis

Diagnosis can be made after the child is 3 years old but often is not made until the child reaches school age and has trouble settling into the routine of being in the

classroom setting. Diagnosis can be difficult and also may be controversial because many of the symptoms are subjective and rely on the assessment of caregivers and teachers. Some authorities have expressed concern that teachers incorrectly label children as hyperactive. The symptoms may be a result of environmental factors that can include broken homes, stress, and nonsupportive caregivers.

The multidisciplinary approach is most effective for diagnosis, that is, one involving pediatric and education specialists, a psychologist, the classroom teacher, family caregivers, and others. A careful detailed history, including school and social functioning, psychological testing, and physical and neurologic examinations, can help in making the diagnosis.

Treatment and Nursing Care

Treatment is also multidisciplinary. Learning situations should be structured so that the child has minimal distractions and a supportive teacher. Home support is necessary and requires structured, consistent guidance from the caregivers. Medication is used for some children. Stimulant medications, such as methylphenidate (Ritalin, Concerta) and dextroamphetamine (Dexedrine), have often been used. When given in large amounts, these medications may suppress the appetite and affect the child's growth. Pemoline (Cylert) has been used but generally with less success than methylphenidate and dextroamphetamine. Using stimulants for a hyperactive child seems paradoxical, but these drugs apparently stimulate the area of the child's brain that aids in concentration, thus enabling the child to have better control.

In the health care setting the nurse should maintain a calm, patient attitude toward the child with ADHD. The child should be given only one simple instruction at a time. Limiting distractions, using consistency, and offering praise for accomplishments are invaluable methods of working with these chil-

A Personal Glimpse



I don't really mind it. When I don't take my meds. I go crazy or bonkers (sometimes). I'm on my pills cause of my behavior. And also to control the ways I talk (like so I won't blurt out in class). I was taught to control my actions, don't let my actions control me.

Eddie, a 9-year-old who takes medication for ADHD

LEARNING OPPORTUNITY: What feelings do you think this child experiences in those times when he is not able to control his behavior? What would you say to this child to encourage him to talk about his disorder and his feelings?

dren. The families of children with ADHD need a great deal of support. Primary family caregivers in particular can become frustrated and upset by the constant challenge of dealing with a child with ADHD. Building the child's self-esteem, confidence, and academic success must be the primary goal of all who work with these children.

TEST YOURSELF

- What causes an allergic reaction? What are some of the common allergens?
- What characteristics are seen in the child with ADHD?
- How is ADHD treated?

School Phobia

School absenteeism is a national problem. Children are absent from school for a variety of reasons, one of which may be school phobia. Children who develop school phobia may be good students, with girls affected more often than boys. Teachers and nurses can help detect school phobia by paying close attention to absence patterns.

Clinical Manifestations

School-phobic children may have a strong attachment to one parent, usually the mother, and they fear separation from that parent, perhaps because of anxiety about losing her or him while away from home. School phobia may be the child's unconscious reaction to a seemingly overwhelming problem at school. The parent can unwittingly reinforce school phobia by permitting the child to stay home. The symptoms—vomiting, diarrhea, abdominal or other pain, and even a low-grade fever—are genuine and are caused by anxiety that may approach panic. They disappear with relief of the immediate anxiety after the child has been given permission to stay home.

Treatment and Nursing Care

Treatment includes a complete medical examination to rule out any organic cause for the symptoms and school-family conferences to help the child return to school. Those working with these children must recognize that they really do want to go to school but for whatever reason cannot make themselves go; these children are not delinquents. The school nurse and teacher along with other professionals, such as a social

worker, psychologist, or psychiatrist, all may contribute to resolving the problem. If the child fears a specific factor at school, such as an overly critical teacher, the child may need to be moved to another class or school.

KEY POINTS

- ▶ A simple partial motor seizure causes a localized motor activity, such as shaking of an arm, leg, or other body part. Simple partial sensory seizures may include sensory symptoms, called an aura, which signals an impending attack. Complex partial (psychomotor) seizures begin in a small area of the brain and can cause memory loss and staring.
- ▶ Tonic-clonic seizures consist of four stages. In the prodromal period the child may be drowsy or dizzy. An aura is a warning and occurs immediately before the seizure. During the tonic phase the muscles contract and the extremities stiffen. The initial rigidity of the tonic phase changes to generalized jerking muscle movements in the clonic phase. The jerking movements gradually diminish and then disappear. Sleep usually occurs during the postictal stage.
- ▶ In absence seizures there is loss of awareness and eye blinking or twitching, but the child does not fall. After the seizure, the child is alert and continues conversation. Atonic or akinetic seizures cause a sudden momentary loss of consciousness, muscle tone, and postural control, and the child may fall. In myoclonic seizures there is a sudden jerking of a muscle or group of muscles, often in the arms or legs. Infantile spasms usually indicate a cerebral defect and consist of muscle contractions and rolling of the eyes.
- ▶ An asthma attack can be triggered by a hypersensitive response to allergens; foods such as chocolate, milk, eggs, nuts, and grains; exercise; or exposure to cold or irritants such as wood-burning stoves, cigarette smoke, dust, and pet dander. Infections, stress, or anxiety can also trigger an asthma attack.
- ▶ During an asthma attack the combination of smooth muscle spasms, which cause the lumina of the bronchi and bronchioles to narrow; edema; and increased mucus production causes respiratory obstruction.
- ▶ Group A beta-hemolytic streptococcus is the bacterium usually responsible for rheumatic fever.

- ▶ Major manifestations of rheumatic fever include carditis (inflammation of the heart), polyarthritis (migratory arthritis), and chorea (disorder characterized by emotional instability, purposeless movements, and muscular weakness).
- ▶ Symptoms of appendicitis in the older child may be pain and tenderness in the right lower quadrant of the abdomen, nausea and vomiting, fever, and constipation. The young child has difficulty localizing the pain, may act restless and irritable, and may have a slight fever, a flushed face, and a rapid pulse. Usually, the white blood cell count is slightly elevated.
- ▶ Pinworms invade the cecum and may enter the appendix. The infestation occurs when the pinworm eggs are swallowed. Roundworms are spread from the feces of infested people. Roundworm infestation is usually found in areas where sanitary facilities are lacking and human excreta are deposited on the ground. The hookworm lives in the human intestinal tract and is prevalent in areas where infected human excreta are deposited on the ground; the hookworms penetrate the skin of barefoot people.
- ▶ Good skin care in the child with diabetes is important because even small breaks in the skin can become major problems for the diabetic child. Correct insulin administration and rotating of sites help insulin absorption. Exercise is important in the diabetic because it decreases the blood glucose level by burning carbohydrates for energy.
- ▶ Physiologic causes of enuresis may include a small bladder capacity, urinary tract infection, and lack of awareness of the signal to empty the bladder because of sleeping too soundly.
- ▶ In a complete fracture the fragments of the bone are separated. In an incomplete fracture the fragments remain partially joined. The types of fractures seen in children are simple or closed; compound or open, where the bone penetrates the skin; spiral fractures, which twist around the bone; or greenstick fractures.
- ▶ Neurovascular checks are done in a child with a musculoskeletal disorder to monitor the child's neurovascular status to detect and prevent tissue and nerve damage.
- ▶ Monitoring the neurovascular status is sometimes referred to as CMS (circulation, movement, sensation) checks and includes observing, documenting, and reporting pain, pulses, paresthesia, paralysis, or pallor.
- ▶ Osteomyelitis is an infection of the bone usually caused by *Staphylococcus aureus*.
- ▶ The most common form of muscular dystrophy is Duchenne (pseudohypertrophic) muscular dystrophy. The characteristics include difficulty standing or walking, trunk muscle weakness, and often mild mental retardation. Weakness of leg, arm, and shoulder muscles progresses gradually, with the child usually becoming wheelchair-bound.
- ▶ The treatment for osteosarcoma is to remove the bone or the limb where the tumor is found. For Ewing's sarcoma the tumor must be removed, and radiation is done. In both disorders chemotherapy is given.
- ▶ Enteric-coated aspirin has long been the drug of choice for JRA, but because of the concern of aspirin therapy and Reye syndrome, NSAIDs such as naproxen and ibuprofen are used. The primary purpose of using these drugs is their anti-inflammatory effects. To decrease the side effects, the drugs should be administered with food or milk.
- ▶ Scoliosis is a lateral curvature of the spine, either structural or functional. Nonsurgical treatment includes electrical stimulation; the use of braces, such as the Boston brace or TLSO brace; or traction. Surgical treatment includes the use of rods, screws, hooks, and spinal fusion.
- ▶ Pediculosis of the scalp is treated using nonprescription medications such as Pronto, RID, A-200, and permethrin (Nix). After the hair is shampooed thoroughly and dried, it is combed with a fine-toothed comb dipped in warm white vinegar to remove remaining nits and nit shells. For protection when treating a child in the hospital, wear a disposable gown, gloves, and head cover.
- ▶ Hyposensitization is performed for the allergens that produce a positive reaction on skin testing. The allergist sets up a schedule for injections in gradually increasing doses until a maintenance dose is reached.
- ▶ Skin allergies and rashes are usually treated with topical preparations, such as lotions, ointments, and greases, plus cool soaks.
- ▶ Characteristics seen in the child with ADHD include impulsive behavior, ease in being distracted, fidgeting or squirming, difficulty sitting still, problems following through on instructions despite being able to understand them, inattentiveness when spoken to, losing of things, going from one uncompleted activity to another, difficulty taking turns, and talking excessively. The child often engages in dangerous activities without considering the consequences.
- ▶ The symptoms seen in the child with school phobia are caused by anxiety that may approach panic.

REFERENCES AND SELECTED READINGS

Books and Journals

- Berry, A. K. (2006). Helping children with nocturnal enuresis. *American Journal of Nursing*, 106(18), 56–64.
- Cassidy, J. T. (2006). Rheumatic diseases of childhood. In *Oski's pediatrics: Principles and practice* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Connelley, T. W. (2005). Family functioning and hope in children with juvenile rheumatoid arthritis. *The American Journal of Maternal/Child Nursing*, 30(4), 245–250.
- Eggleston, P. A. (2006). Asthma. In *Oski's pediatrics: Principles and practice* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Fox Quillen, T. (2005). Putting the brakes on attention-deficit/hyperactivity disorder. *Nursing 2005*, 35(2), 12–13.
- Gambrell, M., & Flynn, N. (2004). Seizures 101. *Nursing 2004*, 34(8), 36–42.
- Hockenberry, M. J., & Wilson, D. (2007). *Wong's nursing care of infants and children* (8th ed.). St. Louis, MO: Mosby Elsevier.
- Kumar, C., et al. (2005). Children with asthma: A concern for the family. *The American Journal of Maternal/Child Nursing*, 30(5), 305–311.
- Laskowski-Jones, L. (2006). First aid for bee, wasp and hornet stings. *Nursing 2006*, 36(7), 58–59.
- North American Nursing Diagnosis Association (NANDA). (2001). *NANDA nursing diagnoses: Definitions and classification 2001–2002*. Philadelphia: Author.
- Pillitteri, A. (2007). *Maternal and child health nursing: Care of the childbearing and childrearing family* (5th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Plotnick, L. P. (2006). Type 1 (insulin dependent) diabetes mellitus. In J. McMillan, R. Feigin, C. DeAngelis, & M. Jones, Jr. (Eds.), *Oski's pediatrics: Principles and practice* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Pruitt, B., & Jacobs, M. (2005). Caring for a patient with asthma. *Nursing 2005*, 35(2), 48–51.
- Pruitt, W. C. (2005). Teaching your patient to use a peak flowmeter. *Nursing 2005*, 35(3), 54–55.
- Ralph, S. S., & Taylor, C. M. (2005). *Nursing diagnosis reference manual* (6th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Sponseller, P. D. (2006). Bone, joint, and muscle problems. In *Oski's pediatrics: Principles and practice* (4th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Sullivan-Bolyai, S., et al. (2006). Fathers' reflections on parenting young children with type I diabetes. *The American Journal of Maternal/Child Nursing*, 31(1), 24–31.
- Wong, D. L., Perry, S., Hockenberry, M., et al. (2006). *Maternal child nursing care* (3rd ed.). St. Louis, MO: Mosby.

Web Addresses

ALLERGIES

www.allergicchild.com

DIABETES

www.childrenwithdiabetes.com

www.jdf.org

EPILEPSY

www.efa.org

FOOD ALLERGIES

www.foodallergy.org

JUVENILE RHEUMATOID ARTHRITIS

www.arthritis.org

MUSCULAR DYSTROPHY

www.mdausa.org

SCOLIOSIS

www.scoliosis-assoc.org

Workbook

NCLEX-STYLE REVIEW QUESTIONS

- The nurse has admitted a 7-year-old child who has received a diagnosis of a seizure disorder and has frequent tonic-clonic seizures. Which of the following are characteristics of tonic-clonic seizures? Select all that apply. The seizure activity
 - might be preceded by a sight, sound, taste, or smell.
 - is usually limited to one side of the body.
 - involves a phase in which the muscles are rigid.
 - causes memory loss and staring.
 - involves a phase in which there are jerking muscle movements.
 - often is followed by a loss of control of bowel and bladder.
- The nurse is teaching a group of caregivers of children who have asthma. The caregivers make the following statements. Which of these statements indicates a need for additional teaching?
 - “We need to identify the things that trigger our child’s attacks.”
 - “I always have him use his bronchodilator before he uses his steroid inhaler.”
 - “We will be sure our child does not exercise to prevent attacks.”
 - “She drinks lots of water, which I know helps to thin her secretions.”
- A child with rheumatic fever will *most likely* have a history of which of the following?
 - A sibling diagnosed with the disease
 - A recent strep throat infection
 - Bruising easily
 - Increased urinary output
- A nurse admits a child with a diagnosis of possible appendicitis. Of the following signs and symptoms, which would *most likely* be seen in the child with appendicitis?
 - Sore throat, bone and joint pain
 - Itching, swelling around eyes and ankles
 - Convulsions, weight gain or loss
 - Fever, nausea and vomiting
- The nurse is working with a 12-year-old child with type 1 diabetes mellitus. The child asks the nurse why she can’t take pills instead of shots like her grandmother does. Which of the following would be the *best* response by the nurse?
 - “The pills correct a different type of diabetes than you have.”
 - “When your blood glucose levels are better controlled, you can take the pills too.”
 - “Your body does not make its own insulin so the insulin injections help replace it.”
 - “The pills only work for adults who have diabetes. Maybe when you are older, you can take the pills.”
- After an outbreak of pediculosis in the school, the nurse is teaching a group of parents and teachers about ways to help prevent the spread of head lice in the classroom and at home. Which of the following actions would the nurse recommend to this group? Select all that apply.
 - Wash all bedding and clothing in hot water and dry in a hot dryer.
 - Apply medicated lotion to all areas of the body except the face.
 - Wash combs and brushes in medicated shampoo and soak for at least an hour.
 - Report any evidence of infestation immediately to the school officials.
 - Vacuum carpets, car seats, mattresses, and upholstered furniture thoroughly.
 - Wear gloves when preparing food or snacks.

STUDY ACTIVITIES

1. Create a poster or teaching aid to be used in teaching family caregivers of children who have seizure disorders. Include safety precautions, what to do when a child has a seizure and after the seizure, and medication considerations.
2. Go to the following Internet site:
<http://www.lungusa.org/asthma>
 Scroll down the screen on the right-hand side. Click on the section “Asthma in Children.” Click on “Early Warning Signals.”
 - a. List six areas covered on this site that you could share with a family of a child with asthma.
 - b. What five suggestions are given in the area covering “What to Listen For?”
 - c. Read the section on “How to Listen.”
 - d. Describe how you listen to the breath sounds in a child with asthma.
 - e. What are five emergency signs that require immediate treatment?
3. Develop a teaching aid or poster to use in teaching diabetic children how to administer their own insulin injections. Include how you will help this child make an insulin site rotation chart. Present your project to your peers.
4. Go to the Internet site:
<http://www.diabetes.org/wizdom>
 Scroll down the screen on the right-hand side. Click on “Click Here for More Cool Stuff.” Click on “If You Are a Kid or Teen.” Click on “School and Discrimination.”
 After reading about the diabetic child at school, answer the following:
 - a. What does this site suggest should be included in a school packet?
 - b. What would be important for the diabetic child to be allowed to do at school to follow his diabetic plan?
 - c. What are some ideas suggested to prevent discrimination of a child with diabetes?
5. Go to the following Internet site:
<http://www.add.org>
 Under the Information section, click on “Kids Area.”
 - a. List seven areas available on this site that you could share with a child who has ADD.

Click on “School and me with ADD.”

- b. What suggestions could you offer to a child who has ADD to help him or her be more successful in school?
 Click on the back arrow. Click on “Medicine, Me, and ADD.”
- c. Share this story with a school-age child with ADD. What was this child’s reaction?

6. Using the following table, list the areas that must be checked and monitored when doing a neurovascular status check (CMS check) on a child with a fracture. Include the area to be monitored, the definition or explanation, observations, and documentation.

Area to Be Monitored (the 5 Ps)	Definition or Explanation	Observations (What Signs to Look for)	Documentation

7. Develop a list of games and activities that would be appropriate to use for a 10-year-old girl in skeletal traction. Keep in mind the child’s age and stage of growth and development. Share your list with your peers.

CRITICAL THINKING: What Would You Do?

1. Dosage calculation: A school-age child with a diagnosis of a seizure disorder is being treated with Dilantin. The child weighs 58 pounds. The child is being given a dose of 6 mg/kg a day in three divided doses. Answer the following:
 - a. How many kilograms does the child weigh?
 - b. How many milligrams of Dilantin will the child receive in a 24-hour period of time?
 - c. How many milligrams of Dilantin will the child receive in each dose?

- d. If the dose is increased by 20 mg a dose, how many milligrams will then be in each dose?
 - e. How many milligrams will the child receive in a 24-hour period after the dose has been increased?
 2. Rachel, a 6-year-old girl, is brought to the clinic with a dry hacking cough, wheezing, and difficulty breathing. Rachel is coughing up thick mucus. Her parents are with her and are extremely anxious about Rachel's condition. The pediatrician examines Rachel, and a diagnosis of an acute asthma attack is made.
 - a. What other findings might have been noted during a physical examination of Rachel?
 - b. What will most likely be done to treat Rachel's current condition?
 - c. What medications might have been given?
 - d. What would you teach Rachel's parents about prevention of additional attacks?
 3. Dosage calculation: After an appendectomy an 8-year-old child is being medicated with meperidine (Demerol) for postoperative pain. The dosage range for this child is 1.0 to 1.8 mg/kg. The child weighs 55 pounds. The Demerol comes in a prefilled syringe with 50 mg per 1 mL. Answer the following:
 - a. How many kilograms (kg) does the child weigh?
 - b. What is the low dose for this child?
 - c. What is the high dose for this child?
 - d. How many milliliters (mL) will be given for the low dose of the medication?
 - e. How many milliliters (mL) will be given for the high dose of the medication?
4. Bradley is a 6-year-old boy who is in a play group with your child. Bradley's mother is talking with you and tells you she is concerned about Bradley because he has been potty trained, but now he is wetting the bed every night and sometimes has accidents during the day. She asks you if you think she should take her child to see their pediatrician.
 - a. What would you suggest to Bradley's mother about seeing his pediatrician?
 - b. What questions do you think the pediatrician might ask Bradley's mother?
 - c. What are the possible physiologic causes of enuresis in children?
 - d. What are frequent psychological causes of enuresis in children?
5. Twelve-year-old Carrie has scoliosis and must wear a TLSO brace. She says she thinks it's really ugly. Carrie tells you she doesn't want to go to school because she can't wear clothes similar to those of her friends.
 - a. What feelings do you think Carrie might be going through in this situation?
 - b. What would you say in response to Carrie?
 - c. What are some ideas you could share with Carrie regarding clothing she might wear?