
FUNDAMENTALS
of
Nursing

Contents

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Fundamentals of Nursing I

NURT 1307

Credits: Four credits, Three credits theory + One credit Lab

Placement: Freshman year, 1st semester

Prerequisites: None

Course Description

The course is designed to introduce the student to the nursing skills & concepts in client care, making them knowledgeable and skillful when administering nursing care to clients. The purpose of this course is to offer a foundation in nursing to make sure that care from competent & concerned health care is provided whenever & wherever the need arises. Different concepts and skills will be taught to students about: familiarize students with the nursing process steps in understanding human needs or problems, and promoting their ability to record and report to ensure safe continuity of care, to control infection, measure vital signs accurately, demonstrate understanding of physical assessment and able to promote the client comfort and sleep, efficient usage of body mechanics, & passive range of motion exercises, will help students to develop an understanding of proper ambulatory technique for patient's condition care focus on preoperative care & postoperative care, promotion of urinary, bowel elimination, medication administration, care of death and dying and the concepts nursing process application as well, to promote the quality of care.

Course Objectives

At the end of this course the student will be able to:

1. Demonstrate understanding the nursing process steps by writing a nursing care plan
2. Utilize the assertive communication as the most appropriate communication style
3. Identify psychosocial and physiological needs of the client
4. Discuss nursing interventions used to interrupt the sequence in the infection process and practices that promote health.
5. Describe factors that influence personal hygiene practices
6. Evaluate the nursing process and how it pertains to admission, discharge, transfers and referrals of client.
7. Identify nursing interventions for common patient reactions to hospitalization.
8. Demonstrate efficiency when monitoring a patient's health (Vital Signs).
9. Demonstrate understanding methods by which the nurse can ensure accurate measurement of vital signs and recording and reporting.
10. Describe the nursing responsibilities and necessary skills for the physical examination/nursing assessment.

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11. Discuss the nursing intervention necessary for proper preparation for a patient having diagnostic special examination.
12. Outline nursing interventions that promote rest and sleep.
13. Assess and evaluate nursing interventions that are appropriate for individuals across the life span to help ensure a safe environment.
14. Discuss the responsibilities of the nurse in pain control.
15. Describe the purposes for properly positioning the patient
16. Explain appropriate technique for turning, moving, and carrying the patient.

Course Outline

1. Nursing Process: The Model for Nursing

- Assessment
- Diagnosis
- Outcome Identification
- Planning
- Implementation
- Evaluation

2. Recording and Reporting using SOPIER method

3. Preventing Infection

- Asepsis
- Infection Control

4. Performing Assessment and Evaluation

- Admission, Discharge Transfer, and Referral

5. Assisting With Basic Needs

- Hygiene
- Sleep and Rest
- Comfort
- Safety
- Oxygenation

6. Assisting the Inactive Patient

- Body Mechanics, Positioning, and Moving

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Teaching and Learning Methods

1. Lectures
1. Presentation
2. Homework
3. Audio-visual formats

Evaluation:

Attendance, participation, notebook, and quizzes	20%
Midterm Exams	30%
. Final Exam	50%
	100%

Suggested References

Fundamental Nursing Skills & Concepts, Barbara k. Timby, 10th edition, 2013

Fundamental Nursing Skills & Concepts, Barbara k. Timby, 10th edition, 2017

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Nursing Foundations

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Name one historical event that led to the demise of nursing before the time of Florence Nightingale.
2. Identify four reforms for which Florence Nightingale is responsible.
3. Describe at least five ways in which early US training schools deviated from those established under the direction of Florence Nightingale.
4. Name three ways that nurses used their skills in the early history of US nursing.
5. Explain how art, science, and nursing theory have been incorporated into contemporary nursing practice.
6. Discuss the evolution of definitions of nursing.
7. List four types of educational programs that prepare students for beginning levels of nursing practice.
8. Identify at least five factors that influence choice of educational nursing program.
9. State three reasons that support the need for continuing education in nursing.
10. Describe four skills that all nurses use in clinical practice.

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Nursing in Islam:

Nursing in Qur'an and Sunnah.

“ heal the breasts of believers ”

وَيَشْفِ صُدُورَ قَوْمٍ مُؤْمِنِينَ14- Tawba

“ and a healing for the diseases in your hearts ”

وَشِفَاءٌ لِمَا فِي الصُّدُور Yonos – 57

“ we send down stag by stage in the Qur'an and that which is a healing and a mercy to those who believe” Israa – 82

وَنُنَزِّلُ مِنَ الْقُرْآنِ مَا هُوَ شِفَاءٌ وَرَحْمَةٌ لِلْمُؤْمِنِينَ

“and when I am ill, it is He who curs me ”

وَإِذَا مَرِضْتُ فَهُوَ يَشْفِينِ80 – Shoaara

And there are many statements of our prophet. Muhammad related to this subject <u>example:</u>

Our God create treatment for every disease some people know it and some of them don’t.

Seek for treatment and medical help.

Moslem women and nursing in Islam.

The first nurse in Islam (world).

Rufida as *the first nurse in Islam*,

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Nursing In Palestine:

1. Turkish era (1517 – 1917).
2. British mandating (1921 -1948).
3. Jordanian and Egyptian control (1948 – 1967) :

- West bank :

August Victoria nursing school, saint john, saint Luke's .

- Gaza strip:

Christian missionary school, shifa, and Baptist school .

4. Israeli occupation:

- Caritas nursing school, Makassed Islamic .
- Charitable hospital, Ibin-sina, al Itehad, Bethlehem university nursing college, and, Qualified school of nursing

5. Palestinian national authority:

- Palestine college of nursing, Falooja college of nursing, Military nursing school, Nursing college at IUG, Department of nursing at UCST and al-Azhar university and others.

Nursing Origins

- Nursing is one of the youngest profession but oldest art.
- Its hallmark was caring more than curing.
- During the middle ages in Europe religious groups assumes many roles of nursing, as Christian nuns, priests. They were overworked and overwhelmed because of their limited numbers, especially during periods when plague spread quickly in communities.

Florence Nightingale

Born in1820 to a wealthy family, she grew up in England, was well educated, and traveled extensively. Despite strong opposition from her family, Nightingale began training as a nurse at the age of 31. The outbreak of the Crimean War and a request by the British to organize nursing care for a military hospital in Turkey gave Nightingale an opportunity for achievement.

"I attribute my success to this: I never gave or took any excuse." **Florence Nightingale**

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The Crimean War

On 28 March 1854 Britain and France declared war on Russia, and for the next two years British, French, Sardinian, and Turkish troops fought against Russians in the Crimean War. The loss of life in the war was colossal; of 1 650 000 soldiers who began the war (of all nations), 900 000 died. The majority of those who perished did not die from wounds; rather they died from diseases brought about by the terrible living conditions which they suffered. In these notes we review the Crimean War, and the role Florence Nightingale had in highlighting the plight of the soldiers.

The Nightingale Reformation

Nightingale's contributions

- Identifying the personal needs of the patient and the role of the nurse in meeting those needs
- Establishing standards for hospital management
- Establishing a respected occupation for women
- Establishing nursing education

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- Recognizing the two components of nursing: health and illness
- Believing that nursing is separate and distinct from medicine
- Recognizing that nutrition is important to health
- Instituting occupational and recreational therapy for sick people
- Stressing the need for continuing education for nurses
- Maintaining accurate records, recognized as the beginnings of nursing research

NURSING IN THE UNITED STATES

The American Civil War occurred around the same time as the Nightingale reformation. Like England, the United States found itself involved in a war with a lack of an organized trained nursing staff to care for the sick and wounded.

Applicants had to submit two letters of recommendation attesting to their moral character, integrity, and capacity to care for the sick.

US Nursing Schools

- After the Civil War, US training schools for nurses began to be established.
- Training periods lengthened from 6 months to 3 full years. Graduate nurses received a diploma attesting to their successful completion of training.

Expanding Horizons of Practice

- US nurses began the 20th century by distinguishing themselves in caring for the sick and disadvantaged outside of hospitals.
- Some nurses moved into communities and established "settlement houses" where they lived and worked among poor immigrants.

Contemporary Nursing (التمريض المعاصر)

Combining nursing art with science (skills & knowledge)

Art: *"Ability to perform an act skillfully ".*

Students learned this art by watching and imitating the techniques performed by other

Science:*" Body knowledge unique to particular subject".*

Develops from observing and studying the relationship of one phenomenon to another.

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Integrating the nursing theory

The word theory (opinion, belief, or view) comes from a Greek word that means vision.

A scientist may study the relation between two phenomena to derive a theory.

Florence Nightingale and others have examined the relationships among humans, health, the environment, and nursing. The outcome of such analysis becomes the basis for nursing theory

TABLE 1-2 Nursing Theories and Applications

THEORIST	THEORY	EXPLANATION
Florence Nightingale 1820–1910	**Environmental Theory**	
	Man	An individual whose natural defenses are influenced by a healthy or unhealthy environment
	Health	A state in which the environment is optimal for the natural body processes to achieve reparative outcomes
	Environment	All the external conditions capable of preventing, suppressing, or contributing to disease or death
	Nursing	Putting the client in the best condition for nature to act
	Synopsis of theory	External conditions such as ventilation, light, odor, and cleanliness can prevent, suppress, or contribute to disease or death
	Application to nursing practice	Nurses modify unhealthy aspects of the environment to put the client in the best condition for nature to act
Virginia Henderson 1897–1996	**Basic Needs Theory**	
	Man	An individual with human needs that have unique meaning and value
	Health	The ability to independently satisfy human needs composed of 14 basic physical, psychological, and social elements
	Environment	The setting in which a person learns unique patterns for living
	Nursing	Temporarily assisting a person who lacks the necessary strength, will, and knowledge to satisfy one or more of 14 basic needs
	Synopsis of theory	People have basic needs that are components of health. The significance and value of these needs are unique to each person
	Application to nursing practice	Nurses assist in performing those activities that the client would perform if he or she had the strength, will, and knowledge

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Dorothea Orem 1914–2007	**Self-Care Theory**	
	Man	An individual who uses self-care to sustain life and health, to recover from disease or injury, or to cope with its effects
	Health	The result of practices that people have learned to carry out on their own behalf to maintain life and well-being
	Environment	External elements with which people interact in the struggle to maintain self-care
	Nursing	A human service that assists people to progressively maximize their self-care potential
	Synopsis of theory	People learn behaviors that they perform on their own behalf to maintain life, health, and well-being
	Application to nursing practice	Nurses assist clients with self-care to improve or to maintain health
Sister Callista Roy 1939–	**Adaptation Theory**	
	Man	A social, mental, spiritual, and physical being affected by stimuli in the internal and external environments
	Health	A person's ability to adapt to changes in the environment
	Environment	Internal and external forces in a continuous state of change
	Nursing	A humanitarian art and expanding science that manipulates and modifies stimuli to promote and to facilitate humans' ability to adapt
	Synopsis of theory	Humans are biopsychosocial beings; a change in one component results in adaptive changes in the others
	Application to nursing practice	Nurses assess biologic, psychological, and social factors interfering with health; alter the stimuli causing the maladaptation; and evaluate the effectiveness of the action taken

Defining nursing

Nursing definitions by:

Florence Nightingale

putting individuals in the best possible condition for nature to restore and preserve health.

Virginia Henderson

Assist the individual, sick or well, in the performance of those activities contributing to health or its recovery (or to a peaceful death) that he could perform unaided if he had the necessary strength, will or knowledge. And to do this in such a way as to help him gain independence as rapidly as possible.

14 Fundamental Needs of Human (Virginia Henderson)

1. Breathe normally
2. Eat and drink adequately
3. Eliminate body wastes
4. Move and maintain desirable postures

5. Sleep and rest

6. Select suitable clothes—dress and undress

7. Maintain body temperature within normal range by adjusting clothing and modifying the environment

8. Keep the body clean and well groomed and protect the integument

9. Avoid dangers in the environment and avoid injuring others

10. Communicate with others in expressing emotions, needs, fears, or opinions

11. Worship according to one's faith

12. Work in such a way that there is a sense of accomplishment

13. Play or participate in various forms of recreation

14. Learn, discover, or satisfy the curiosity that leads to normal development and health and use the available health facilities.

American Nurses Association

the American Nurses Association (ANA) defines nursing

as follows:

Protection, promotion, and optimization of health and abilities.

Prevention of illness and injury.

Alleviation of suffering through the diagnosis and treatment of human response.

Advocacy in the care of individuals, families, communities, and populations.

World health organization (WHO)

Nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings.

It includes the promotion of health, the prevention of illness, and the care of ill, disabled and dying people.

The Educational Ladder

Two basic educational options are available to those interested in a nursing career:

- Practical (vocational) nursing
- Registered nursing.

The following factors influence the choice of a nursing program:

- Career goals
- Geographic location of schools
- Costs involved

- Length of programs
- Reputation and success of graduates
- Flexibility in course scheduling
- Opportunity for part-time versus full-time enrollment
- Ease of movement into the next level of education

Practical/Vocational Nursing

Abbreviated programs in practical nursing were developed across the country to teach essential nursing skills. The goal was to prepare graduates to care for the health needs of infants, children, and adults.
The average length of a practical nursing program ranges from 12 to 18 months, after which graduates are qualified to take their licensing examination to be LPN/LVN.

Registered nurse (RN)

Registered nurses (RNs) work under the direction of a physician or dentist in various health care settings ranging from preventive to acute care. They manage or provide direct care to clients who are stable but may have complex health needs, or who are unstable with unpredictable outcomes.

- **Three paths**
  - Hospital-based diploma program (3 years)

Diploma nurses were, and are, well trained. Because of their vast clinical experience (compared with students from other types of programs), they are often characterized as more self-confident and more easily socialized into the role requirements of a graduate nurse.
Movement to increase professionalism in nursing.
Hospital no longer financially subsidizes school of nursing.

  - Associate degree program (diploma)
    - Length: 24 months
    - Aimed at shortening nursing education
    - Would not be expected to work in a management position

  - Baccalaureate program
    - collegiate nursing programs
    - Greatest flexibility in qualifying for nursing positions
    - Preferred in areas requiring substantial independent decision making

- Graduate nursing program
  - Master's-prepared nurses: clinical specialist, nurse practitioner, administrator, educator
  - Doctoral degree: conduct research; advise, administer, and instruct nurses pursuing graduate and undergraduate degrees
- Continuing education
  - Planned learning experience beyond the basic nursing program
  - Rationale for acquiring continuing education

BOX 1-2 Rationales for Acquiring Continuing Education

- No basic program provides all the knowledge and skills needed for a lifetime career.
- Current advances in technology make previous methods of practice obsolete.
- Assuming responsibility for self-learning demonstrates personal accountability.
- To ensure the public's confidence, nurses must demonstrate evidence of current competence.
- Practicing according to current nursing standards helps to ensure that care is legally safe.
- Renewal of state licensure often is contingent on evidence of continuing education.

Nurses use four essential competencies

- Cognitive: Use critical thinking to solve problems creatively
- Technical: Use creatively adapt equipment and technical procedures
- Interpersonal: Use good interactions with patients, family and health team.
- Ethical/legal skills to provide safe and knowledgeable care.

Unique Nursing Skills

- **Assessment skills (Acts that involves collecting data)**

- Following activities requires use of assessment:
  - Interviewing, observing, examining client and family; reviewing client's medical record; obtaining facts from other health care workers.

- **Caring skills (action to restore and maintain health)**
  - Assisting with ADLs
  - Safe care of clients who require invasive or highly technical equipment
  - Helping client become self-reliant

- **Counseling skills**
  - Communicating with client
  - Actively listening
  - Offering pertinent health teaching
  - Providing emotional support
  - Use active listening
  - Clarify client's perspective (own decision)
  - Teach clients: promote healing processes, staying well, preventing illness, and carrying out ADLs
  - Use empathy not sympathy

Empathy: "Intuitive awareness of what the patient is experiencing".

Sympathy: "Feeling as emotionally distraught as the patient".

- **Comforting skills**
  - Provide stability and security during a health-related crisis
  - The nurse becomes the client's guide, companion, and interpreter. This supportive relationship generally increases trust and reduces fear and worry.

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FIGURE 1-8 This nurse offers comfort and emotional support. (Photo by B. Proud.)

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Asepsis

Learning Objectives

On completion of this chapter, the students should be able to:

1. Describe microorganisms.
2. Name and describe eight specific types of microorganisms.
3. Differentiate between nonpathogens and pathogens, resident and transient microorganisms, and aerobic and anaerobic microorganisms.
4. Give two examples of the ways some microorganisms have adapted for their survival.
5. Name the six components in the chain of infection.
6. Cite examples of biologic defense mechanisms.
7. Define health care-associated infection.
8. Discuss the concept of asepsis.
9. Differentiate between medical and surgical asepsis.
10. Identify at least three principles of medical asepsis.
11. List five examples of medical aseptic practices.
12. Name at least three techniques for sterilizing equipment.
13. Identify at least three principles of surgical asepsis.
14. List at least three nursing activities that require application of the principles of surgical asepsis.

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Asepsis

- Preventing infections is one of the most important priorities in nursing
- Microorganisms, living animals or plants visible only with a microscope, are commonly called germs. What they lack in size, they make up for in numbers. Microorganisms are everywhere: in the air, soil, and water, and on and within virtually everything and everyone.

Types of Microorganisms

- Microorganisms are divided into two main groups: nonpathogens or normal flora and pathogens
- Non Pathogens: Mutually beneficial, or neither harming nor helping the host.
- Pathogens have high potential for causing infectious communicable diseases also called contagious diseases and community-acquired infections.

  - Bacteria: Single-celled microorganisms.
  - Viruses: The smallest microorganisms.
  - Fungi: Include yeasts and molds.
  - Rickettsiae: Resemble bacteria; like viruses presented in fleas and lice.
  - Protozoans: single-celled animals Like amebia.
  - Mycoplasmas: lack a cell wall. They are referred to as pleomorphic.
  - Helminths: Are infectious worms.

Survival of Microorganisms

- Many pathogens have mutated to adapt to hostile environments and unfavorable living conditions. Such adaptability has ensured that they continue to pose a threat to humans.

- A spore is a temporarily inactive microbial life form that can resist heat and destructive chemicals and survive without moisture.

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Chain of Infection

- By interfering with the conditions that perpetuate the transmission of microorganisms, humans can avoid acquiring infectious diseases.

- The six essential components of the chain of infection (sequence that enables the spread of disease-producing microorganisms) must be in place if pathogens are to be transmitted from one location or person to another:

1. An infectious agent
2. A reservoir for growth and reproduction
3. An exit route from the reservoir
4. A mode of transmission
5. A port of entry
6. A susceptible host

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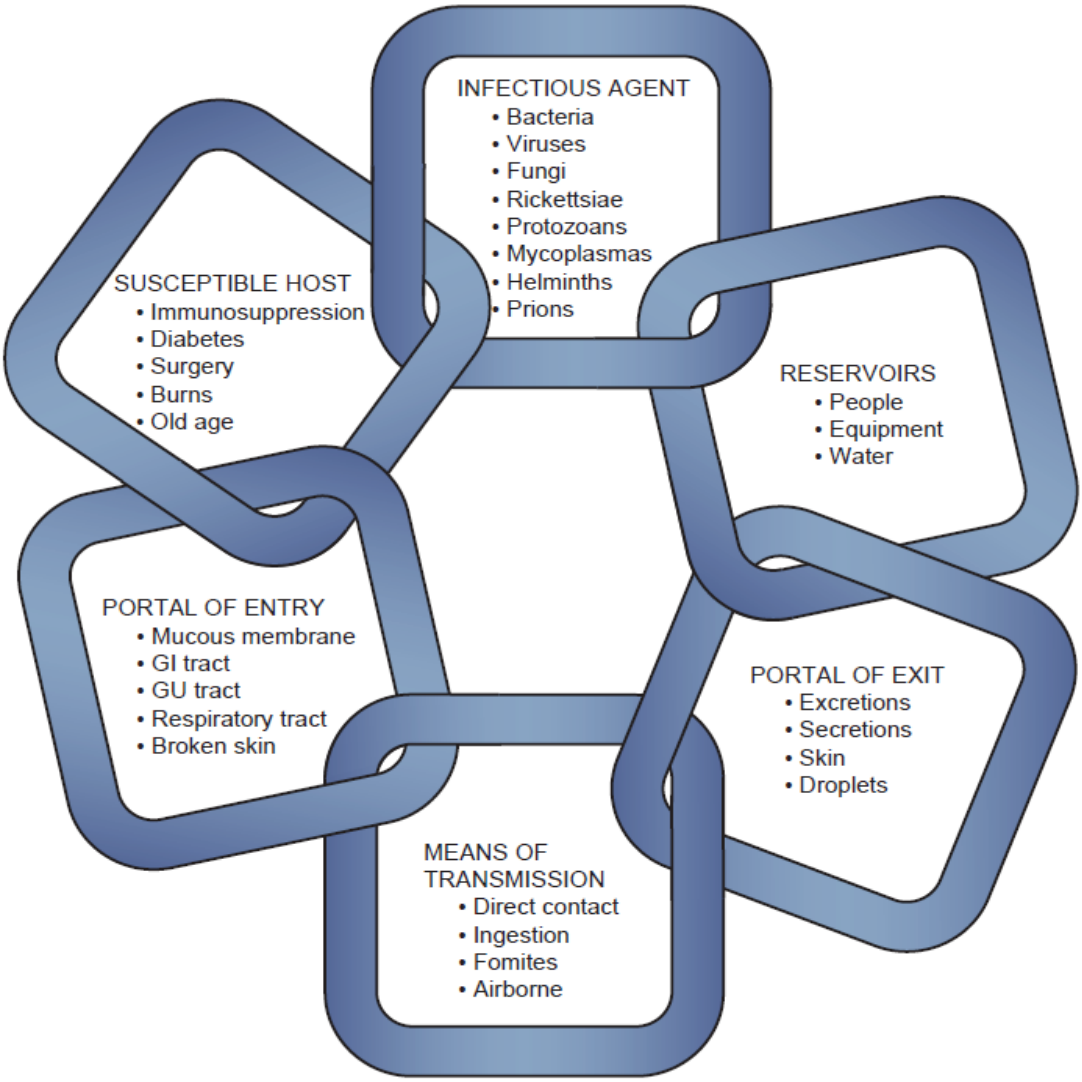

FIGURE 10-2 The chain of infection. GI, gastrointestinal; GU, gastrourinary.

Infectious Agents

- Some microorganisms are less dangerous than others.
- For example, intestinal bacteria help produce vitamin K, which, in turn, helps control bleeding.

Reservoir

- A reservoir is a place where microbes grow and reproduce, providing a haven for their survival. Examples:
- skin,
- shafts of hair
- open wounds
- blood
- lower digestive tract
- nasal passages

The exit route is how microorganisms escape from their original reservoir and move about.

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A mode of transmission is how infectious microorganisms move to another location.

The port of entry is where microorganisms find their way onto or into a new host, facilitating their relocation. One of the most common ports of entry is an opening in the skin or mucous membranes.

TABLE 10-1 Methods of Transmission

ROUTE	DESCRIPTION	EXAMPLE
Contact transmission		
Direct contact	Actual physical transfer from one infected person to another (body surface to body surface contact)	Sexual intercourse with an infected person
Indirect contact	Contact between a susceptible person and a contaminated object	Use of a contaminated surgical instrument
Droplet transmission	Transfer of moist particles from an infected person who is within a radius of 3 ft	Inhalation of droplets released during sneezing, coughing, or talking
Airborne transmission	Movement of microorganisms attached to evaporated water droplets or dust particles that have been suspended and carried over distances greater than 3 ft	Inhalation of spores
Vehicle transmission	Transfer of microorganisms present on or in contaminated items such as food, water, medications, devices, and equipment	Consumption of water contaminated with microorganisms
Vector transmission	Transfer of microorganisms from an infected animal carrier	Diseases spread by mosquitoes, fleas, ticks, or rats

Susceptible Host

- Humans become susceptible to infections when their defense mechanisms are diminished or impaired. A susceptible host, the last link in the chain of infection, is one whose biologic defense mechanisms are weakened in some way
- **Particularly susceptible clients include those who:**
  - Are older adults or premature infants
  - Are burn victims
  - Have suffered major trauma
  - Require invasive procedures such as endoscopy
  - Need indwelling equipment such as a urinary catheter
  - Receive implantable devices such as intravenous catheters
  - Are given antibiotics inappropriately, which promotes microbial resistance

- Are receiving anticancer drugs and anti-inflammatory drugs such as corticosteroids that suppress the immune system
- Are infected with HIV

- Nurses must understand and practice methods to prevent nosocomial infections (infections acquired while a person is receiving care in a health care agency).
- **Asepsis** means those practices that decrease or eliminate infectious agents, their reservoirs, and vehicles for transmission. It is the major method for controlling infection.

Medical Asepsis

- Medical asepsis means those practices that confine or reduce the numbers of microorganisms. Also called, *clean technique*, it involves measures that interfere with the chain of infection in various ways.

Principles of medical asepsis:

- Microorganisms exist everywhere except on sterilized equipment.
- Frequent hand hygiene and maintaining intact skin are the best methods for reducing the transmission of microorganisms.
- Blood, body fluids, cells, and tissues are considered major reservoirs of microorganisms.
- Personal protective equipment such as gloves, gowns, masks, goggles, and hair and shoe covers serves as a barrier to microbial transmission.
- A clean environment reduces microorganisms.
- Certain areas—the floor, toilets, and insides of sinks—are more contaminated than others.
- Cleaning should be done from cleaner to dirtier areas.

Examples of medical aseptic practices include:

- Using antimicrobial agents.
- Performing hand hygiene.
- Wearing hospital garments.
- Confining and containing soiled materials appropriately.
- Keeping the environment as clean as possible.

1. Using Antimicrobial Agents

- Antimicrobial agents are chemicals that destroy or suppress the growth of infectious microorganisms
- Examples are antiseptics, disinfectants, and anti-infective drugs.

TABLE 10-2 Antimicrobial Agents

TYPE	MECHANISM	EXAMPLE	USE
Soap	Lowers the surface tension of oil on the skin, which holds microorganisms; facilitates removal during rinsing	Dial, Safeguard	Hygiene
Detergent	Acts as soap, except detergents do not form a precipitate when mixed with water	Dreft, Tide	Sanitizing eating utensils, laundry
Alcohol	Injures the protein and lipid structures in the cellular membrane of some microorganisms (70% concentration)	Isopropyl ethanol	Cleansing skin, instruments
Iodine	Damages the cell membrane of microorganisms and disrupts their enzyme functions; not effective against *Pseudomonas*, a common wound pathogen	Betadine	Cleansing skin
Chlorine	Interferes with microbial enzyme systems	Bleach, Clorox	Disinfecting water, utensils, blood spills
Chlorhexidine	Damages the cell membrane of microorganisms, but is ineffective against spores and most viruses	Hibiclens	Cleansing skin and equipment
Mercury	Alters microbial cellular proteins	Merthiolate, Mercurochrome	Disinfecting skin
Glutaraldehyde	Inactivates cellular proteins of bacteria, viruses, and microbes that form spores	Cidex	Sterilizing equipment

- **Antiseptics**

Antiseptics, also known as , inhibit the growth of, but do not kill, microorganisms.

An example is alcohol

- **Disinfectants**

Disinfectants, destroy active microorganisms but not spores. Phenol, household bleach, and formaldehyde are examples.

Disinfectants rarely are applied to the skin because they are so strong. Rather, they are used to kill and remove microorganisms from equipment, walls, and floors

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- **Anti-Infective Drugs**

Antibiotics alter the metabolic processes of bacteria but not viruses. They damage or destroy bacterial cell walls or the mechanisms that bacteria need to reproduce. When used, the intent is to kill or control pathogens

Antivirals were developed more recently, Antivirals do not destroy the infecting viruses; rather, they control viral replication (copying) or their release from the infected cells.

2. Hand washing

- Hand washing is an aseptic practice that involves scrubbing the hands with soap, water, and friction.
- Considering how often health care personnel use their hands with clients, it is no surprise that *handwashing is the single most effective way to prevent infections*.

Alcohol-based hand rubs

- Alcohol-based hand rubs remove microorganisms on the hands.
- Alcohol formulations have a brief rather than sustained antiseptic effect, however, nurses must reuse them over the course of a day.
- Advantages of alcohol-based hand rubs over hand washing are that they:
- Take less time.
- More accessible.
- Increase compliance.
- Provide convenience based on their location at the client's point of care,

Performing a Surgical Scrub

A surgical scrub, a type of skin and nail antisepsis, is performed before donning sterile gloves and garments when the nurse is actively involved in an operative or obstetric procedure. The purpose is to more extensively remove transient microorganisms from the nails, hands, and forearms.

Wearing Personal Protective Equipment

- uniforms
- scrub suits or gowns
- masks
- gloves
- protective eyewear

- Hair and Shoe Covers

TABLE 10-3 Differences Between Hand Washing and Surgical Hand Antisepsis

HAND WASHING	SURGICAL HAND ANTISEPSIS
Plain wedding band may be worn	All hand jewelry, including watches, are removed
Faucets with hand controls are used; elbow, knee, or foot controls are preferred	Faucets are regulated with elbow, knee, or foot controls
Liquid, bar, leaflet, or powdered soap or detergent is used	Liquid antibacterial soap is used; devices such as sponges may be incorporated with antibacterial soap
Washing lasts a minimum of 15 seconds	Antisepsis lasts 2–6 min, depending on the antibacterial agent and time interval between subsequent repetitions
Hands are held lower than the elbows during washing, rinsing, and drying	Hands are held higher than the elbows during washing, rinsing, and drying
Areas beneath fingernails are washed	Areas beneath fingernails are cleaned with an orange stick or similar nail cleaner
Friction is produced by rubbing the hands together	Friction is produced by scrubbing with a brush and/or sponge
Hands are dried with paper towels; the paper is used to turn off hand-regulated faucet controls	Hands are dried with sterile towels
Clean gloves are donned if the nurse has open skin or if there is a potential for contact with blood or body fluids	Sterile gloves are donned immediately after the hands are dried

Gloves

Nurses wear clean gloves, sometimes called examination gloves, in the following circumstances:

- As a barrier to prevent direct hand contact with blood, body fluids, secretions, excretions, mucous membranes, and nonintact skin
- As a barrier to protect clients from microorganisms transmitted from nursing personnel when performing procedures or care involving contact with the client's mucous membranes or nonintact skin
- When there is a potential transfer of microorganisms from one client or object to another client during subsequent nursing care
- Examination gloves are generally made of latex
- Unfortunately, some nurses and clients are allergic to latex.

Confining Soiled Articles:

- Utility Rooms
    - Health care agencies have at least two utility rooms: one designated clean and the other considered dirty.
    - Personnel must not place soiled articles in the clean utility room.

- Waste Receptacles
    - Agencies rely on various methods to contain soiled articles until they can be discarded.
    - Most client rooms have a wall-mounted puncture-resistant container for needles or other sharp objects

Keeping the Environment Clean

- Health agencies employ laundry staff and housekeeping personnel to assist with cleaning
- **Terminal disinfection** is more thorough than **concurrent disinfection** and consists of measures used to clean the client environment after discharge.
- Nurses who work in home health can teach the client and family simple aseptic practices for cleaning contaminated articles

Surgical Asepsis

- **Surgical asepsis** means those measures that render supplies and equipment totally free of microorganisms.
- **Sterile technique** is those practices that avoid contaminating microbe-free items.

Sterilization

Sterilization consists of physical and chemical techniques that destroy all microorganisms including spores.

1.Physical Sterilization

Microorganisms and spores are destroyed physically through radiation or heat (boiling water, free-flowing steam, dry heat, and steam under pressure).

- **Radiation**

Ultraviolet radiation can kill bacteria, especially the organism that transmits TB.

- **Boiling Water**

Boiling water is a convenient way to sterilize items used in the home. To be effective, contaminated equipment needs to be boiled for 15 minutes at 212°F (100°C)

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- **Free-Flowing Steam**

Free-flowing steam is a method in which items are exposed to the heated vapor that escapes from boiling water.

- **Dry Heat**

Dry heat, or hot air sterilization, is similar to baking items in an oven. To destroy microorganisms with dry heat, temperatures of 330°to 340°F (165° to 170°C) are maintained for at least 3 hours.

- **Steam Under Pressure**

Steam under pressure is the most dependable method for destroying all forms of organisms and spores.
The autoclave is an example figure 10-8

FIGURE 10-8 An autoclave. (Photo by B. Proud.)

2. Chemical Sterilization

Both gas and liquid chemicals are used to sterilize invasive equipment.

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Principles of Surgical Asepsis

- They preserve sterility by touching one sterile item with another that is sterile.
- Once a sterile item touches something that is not, it is considered contaminated.
- Any partially unwrapped sterile package is considered contaminated.
- If there is a question about the sterility of an item, it is considered unsterile.
- The longer the time since sterilization, the more likely it is that the item is no longer sterile.
- A commercially packaged sterile item is not considered sterile past its recommended expiration date.
- Once a sterile item is opened or uncovered, it is only a matter of time before it becomes contaminated.
- The outer 1-inch margin of a sterile area is considered a zone of contamination.
- sterile wrapper, if it becomes wet, wicks microorganisms from its supporting surface, causing contamination.
- Any opened sterile item or sterile area is considered contaminated if it is left unattended.
- Coughing, sneezing, or excessive talking over a sterile field causes contamination.
- Reaching across an area that contains sterile equipment has a high potential for causing contamination and is therefore avoided.
- Sterile items that are located or lowered below waist level are considered contaminated because they are not within critical view.

Creating a Sterile Field

A sterile field means a work area free of microorganisms. (Skill 10-3)

Nursing Implications

Risk for Infection

Risk for Infection Transmission

Ineffective Protection

Delayed Surgical Recovery

Deficient Knowledge

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Critical Thinking Exercises

1. If the rate of infections increased on your nursing unit, what would you investigate to determine the contributing factors?

2. If the cause of health care-associated infections is related to inadequate hand washing among health care providers, what suggestions would you give for correcting the problem?

3. What methods could be used to evaluate if health care providers are performing hand hygiene appropriately?

4. What recommendations might you suggest to prevent transferring microorganisms from health care providers' homes to clients for whom they care?

Nclex-Style Review Questions

1. Before touching a client, what is the minimum amount of time the nurse should perform an alcohol-based hand rub?

1. 5 seconds
2. 10 seconds
3. 15 seconds
4. 20 seconds

Test Taking Strategy: Select the option that compares to the time it takes to sing the song, "Happy Birthday" twice.

2. A nurse needs to wear a mask while caring for a client. Which nursing actions are appropriate? Select all that apply.

1. The mask is positioned to cover the nurse's nose and mouth.
2. The nurse secures the ties at the back of the head and neck.
3. The nurse adjusts the mask during the course of client care.
4. The nurse avoids wearing the mask longer than 30 minutes.
5. The nurse lowers the mask to her chest area during removal.
6. The nurse discards the mask within a waterproof receptacle.

Test Taking Strategy: Consider if each option is true or false. Eliminate any false or incorrect options.

3. When caring for a client with an eye infection, what is the most important health teaching the nurse can provide to the client?

1. Eat a well-balanced, nutritious diet.
2. Wear sunglasses in bright light.

3. Cease sharing towels and washcloths.

4. Avoid products containing aspirin.

Test Taking Strategy: When some or all options seem appropriate, select one option that represents a priority. Consider an action that interrupts the Chain of Infection.

4. A nurse observes a newly employed nursing assistant perform hand washing. Which of the following actions require more teaching? Select all that apply.

1. The nursing assistant is wearing an engagement ring.
2. The nursing assistant works a teaspoon of soap into a lather.
3. The nursing assistant holds the hands downward during rinsing.
4. The nursing assistant uses a paper towel to dry her hands.
5. The nursing assistant turns the faucet off with her bare hands.
6. The nursing assistant applies hand lotion to her dried hands.

Test Taking Strategy: Consider whether each option describes correct or incorrect actions when performing hand washing. In this question, select options that violate medically aseptic practices, in other words, the actions that are incorrect.

5. A nurse sets up a sterile field prior to changing a client's dressing. Which of the following actions is correct?

1. The nurse first opens the sterile pack by unfolding the wrapper toward herself.
2. The nurse avoids adding supplies in the outer 1-inch margin of the exposed field.
3. The nurse sets a wrapped basin in the center of the sterile field.
4. The nurse pours a sterile solution from 8 to 10 inches above a sterile basin.

Test Taking Strategy: Eliminate options that have the potential for

Comfort, Rest, and Sleep

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Differentiate between comfort, rest, and sleep.
2. Describe four ways to modify the client environment to promote comfort, rest, and sleep.
3. List four standard furnishings in each client room.
4. State at least five functions of sleep.
5. Describe the two phases of sleep and their differences.
6. Describe the general trend in sleep requirements as a person ages.
7. Name 10 factors that affect sleep.
8. List four categories of drugs that affect sleep.
9. Name four techniques for assessing sleep patterns.
10. Describe four categories of sleep disorders.
11. Discuss at least five techniques for promoting sleep.
12. Name two nursing measures that promote relaxation.

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Comfort, Rest, and Sleep

Comfort: State in which a person is relieved of distress.

Rest: Waking state characterized by reduced activity and mental stimulation.

Sleep: State of arousable unconsciousness.

Comfort facilitates rest and sleep

Client Environment

- The term environment is the room where the client receives nursing care and its furnishings.
- Client rooms resemble bedrooms but are no longer the bare, white, sterile environments of a few decades ago.
- client rooms are now brighter, more colorful, and tastefully decorated.
- the wall and floor treatments, lighting, and mechanisms for maintaining climate control are practical and conducive to comfort.
- Wall: relaxing color schemes, wallpapers
- Floor: carpeted or linoleum surface
- Lighting: adequate lighting, adjustable intensity, adequate lighting, both natural and artificial, is important to the comfort of clients and nursing personnel.
- Climate control: temperature, humidity, ventilation

Temperature and Humidity

- Most clients are comfortable when the room temperature is 68° to 74°F (20° to 23°C). Newer buildings provide thermostats in each room so that the temperature can be adjusted to suit the client.
- **Humidity** (the amount of moisture in the air) and **relative humidity** (the ratio between the amount of moisture in the air and the greatest amount of water vapor the air can hold at a given temperature) affect comfort.
- At a relative humidity of 60%, the air contains 60% of its potential water capacity. A relative humidity of 30% to 60% is comfortable for most clients.
- Older adults tend to prefer warmer room temperatures because of decreased subcutaneous fat deposits.

Ventilation

- In hospitals and nursing homes, open windows are a fire and safety hazard, and ceiling fans spread infectious microorganisms. Consequently, ventilation usually occurs through a system of air ducts that circulate air in and out of each client room.

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- Poorly ventilated rooms and buildings tend to smell badly. Removing soiled articles, opening privacy curtains, use an air freshener or deodorizer and open room doors help reduce odors.
- Nurses should be conscientious about their own body and oral hygiene, refrain from wearing overpowering perfume, and avoid smelling of cigarette smoke.

FIGURE 18-1 Typical hospital room furnishings. (Photo by B. Proud.)

Room Furnishings

- Manufacturers of hospital furnishings attempt to design equipment that is both attractive and practical The bed and its components as the mattress and pillows, chairs, overbed table, and bedside stand must be safe, durable and comfortable.

Bed: Hospital beds are adjustable; that is, the height and position of the head and knees can be changed either electronically or manually.

Side rails are considered a form of physical restraint in long-term care facilities, and their use must be justified.

Hospital mattresses generally consist of tough materials that will withstand long-term use. Because mattresses are washed but not sterilized between uses, they are covered with a waterproof coating that withstands cleaning with strong antimicrobial solutions.

Pillows: Pillows are primarily used for comfort, but they are also used to elevate a part of the body, relieve swelling.

Bed Linen: The linens used for most hospital beds includes the following:

- Mattress pad
- Bottom sheet that is sometimes fitted
- Optional draw sheet that is placed beneath the client's hips
- Top sheet
- Blanket, depending on the client's preference
- Spread

Privacy Curtain: It can be drawn completely around each client's bed. The privacy curtain preserves the client's dignity and modesty.

Overbed table: An overbed table is a portable, flat platform positioned over the client's lap.

Bedside stand: A bedside stand is actually a small cupboard. It usually contains a drawer for personal items and two shelves, one for bathing equipment, and other for elimination equipment, water and a drinking container are placed atop the bedside stand. .

Chairs: one chair per client in each room. Hospital chairs usually are straight-backed to facilitate good postural support.

Sleep and rest

No matter how comfortable the physical environment or how attractive and homelike the furnishings, failure to promote rest and sleep may sabotage or prolong recuperation. Although sleep requirements vary, alterations in sleep patterns can have serious physical and emotional consequences.

Functions of Sleep

- Reducing fatigue
- Stabilizing mood
- Improving blood flow to the brain
- Increasing protein synthesis
- Maintaining the disease fighting mechanisms of the immune system
- Promoting cellular growth and repair
- Improving the capacity for learning and memory storage

BOX 18-2 Effects of Chronic Sleep Deprivation

- Reduced physical stamina
- Altered comfort, such as headaches and nausea
- Impaired coordination, especially of fine motor skills
- Loss of muscle mass and weight
- Increased susceptibility to infection
- Slower wound healing
- Decreased pain tolerance
- Poor concentration
- Impaired judgment
- Unstable moods
- Suspiciousness

Sleep Phases

- Sleep is divided into two phases: Non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep.
- Those names derive from the periods during sleep when eye movements are either subdued or energetic.
- NREM sleep, which progresses through four stages, is also called "slow wave sleep" because during this phase electroeneephalographic waves appear as progressively slower oscillations.
- The REM phase of sleep is referred to as paradoxical sleep because the electroencephalographic waves appear similar to those produced during periods of wakefulness, but it is the deepest stage of sleep, thus.
- NREM sleep is characterized as quiet sleep and REM sleep as active sleep.

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TABLE 18-2 Sleep Requirements

AGE	TOTAL SLEEP TIME	PERCENTAGE IN REM
Newborn	16–20 hr/day	50
3 months–1 year	14–15 hr/day	35
Toddler	12 hr/night plus 1 or 2 naps	No data
Preschool	9–12 hr/night	No data
5–6 years	11 hr/night	20
6–11 years	10–11 hr/night	No data
11 years	9 hr/night	No data
Adolescent	7–9 hr/night	25
Adult	7–9 hr/night	20–25
Elderly	7–9 hr/night	13–15

TABLE 18-3 Factors Affecting Sleep

SLEEP-PROMOTING FACTORS	SLEEP-SUPPRESSING FACTORS
Darkness, dim light	Sunlight, bright light
Consistent sleep schedule	Inconsistent sleep schedule
Secretion of melatonin	Suppression of melatonin
Familiar sleep environment	Strange sleep environment
Optimal warmth and ventilation	Cold, hot, stuffy room
Performance of sleep rituals	Disturbance of sleep rituals
Sedative, hypnotic drugs	Stimulant drugs
Depression	Depression, anxiety, worry
Relaxation	Activity
Satiation	Hunger, thirst
Proteins containing L-tryptophan	Protein-deficient diets
Excessive alcohol consumption	Metabolism of alcohol
Comfort	Pain, nausea, full bladder
Quiet	Noise
Effortless breathing	Difficulty breathing

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Factors Affecting Sleep

Age: Both the quantity and the quality of sleep decreases with age. Older adults suffer disproportionately from chronic sleep deprivation.

Light: Daylight and darkness influence the sleep- wake cycle. Circadian rhythm (phenomena that cycle on a 24-hour basis) is a term derived from two Latin words: circa (about) and dies (day). the pineal gland secretes melatonin (a hormone that induces drowsiness and sleep); light triggers the suppression of melatonin secretion.

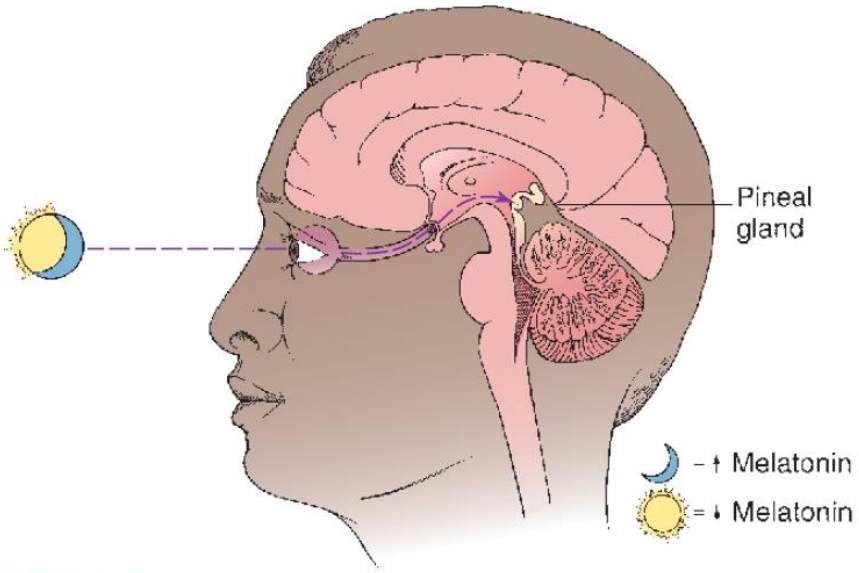

FIGURE 18-6 A photosensitive light system influences the sleep–wake cycle.

Activity: especially exercise, increases fatigue and the need lot sleep. Activity appears to increase both REM and NREM.

Environment: Most people sleep best in their usual environment.

Motivation: When a person has no particular reason to stay awake, sleep generally occurs easily.

Emotions and Moods: Depressive disorders are classically associated with an inability to sleep or the tendency to sleep more than usual.

Food and Beverages: Hunger or thirst interferes with sleep. The consumption of particular foods and beverages also may promote or inhibit the ability to sleep.

Illness: Stress, anxiety, and discomfort accompany almost any illness, which can alter normal sleep patterns.

Drugs: Sedatives and tranquilizers (drugs that produce a relaxing and calming effect) Hypnotics are drugs that induce sleep. Stimulants cause wakefulness

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SLEEP ASSESSMENT

Questionnaires:

Does the client snore or gasp for air when sleeping?

Docs the client kick or thrash around while sleeping?

Does the client sleepwalk?

Sleep Diary:

A sleep diary is a daily account of sleeping and waking activities.

Nocturnal Polysomnography: Nocturnal polysomnography is a diagnostic assessment technique in which a client is monitored for an entire night's sleep to obtain physiologic data.

Multiple Sleep Latency Test: Clients who have certain sleep disorders causing daytime sleepiness have a short latency period

Sleep Disorders

Insomnia: Means difficulty in falling asleep, awakening frequently during the night, or awakening early. It results in feeling unrested the next day.

Hypersomnia: Is feeling sleepy despite getting normal sleep.

- Sleep Apnea/Hypopnea Syndrome the sleeper stops breathing or breathing slows for 10 seconds or longer five or more times per hour, Apnea (the cessation of breathing) and hypopnea (hypoventilation)
- Narcolepsy is characterized by the sudden onset of daytime sleep.

Sleep-Wake Cycle Disturbances: results from a sleep schedule that involves daytime sleeping and interferes with biologic rhythms.

Sundown syndrome is disorientation as the sun sets

Sunrise syndrome is an early-morning confusion

Shift Work: Those who work evening or night shifts or who switch from one shift to another are especially prone to unsynchronized sleep-wake cycles.

Jet Travel: Jet travel causes a sudden change in the currently established photoperiod (the number of daylight hours) to which a person is accustomed.

Parasomnia: Are conditions associated with activities that cause arousal or partial arousal.

Somnambulism (sleepwalking)

Nocturnal enuresis (bedwetting)

Sleep talking

Nightmares and night terrors

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Nursing Implications

- Identify nursing diagnoses
  - Fatigue
  - Impaired bed mobility
  - Disturbed sleep pattern
  - Sleep deprivation
  - Readiness for enhanced sleep
  - Relocation stress syndrome
  - Risk for injury
  - Impaired gas exchange
    - Develop plan of care

- Sleep-promoting nursing measures
  - Maintaining sleep rituals
  - Reducing intake of stimulating chemicals
  - Promoting daytime exercise
  - Adhering to regular schedule for retiring and waking
  - Progressive relaxation
  - Back massage

Instruction to promote sleep

- Resist napping during the day.
- Use the bed and bedroom just for sleeping.
- Perform sleep rituals.
- Go to bed and get up at approximately the same time, even on weekends or days off.
- If you cannot get to sleep for more than 20 to 30 minutes, get out of bed and do something else such as reading.
- Try a bedtime relaxation tape that plays soothing music, sounds of nature, or a constant background sound (white noise).
- Exercise regularly during the day but not late in the evening.
- Avoid alcohol, nicotine, and caffeine.
- Eat dairy products and other proteins daily.
- Modify the temperature and ventilation in the bedroom according to personal preferences.

- Use earplugs or eyeshades to reduce environmental noise or light.
- Avoid using nonprescription or prescription sleeping pills unless they have been recommended by a physician. Hypnotics should be used only on a short-term basis.
- Try drinking chamomile tea, which some claim improves sleep.
- Follow label directions on any medications.
- If a diuretic drug is prescribed, take it early in the morning.

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Progressive relaxation: Is a therapeutic exercise in which a person actively contracts then relaxes muscle groups to break the worry-tension cycle that interferes with relaxation.

Back Massage: Massage (stroking the skin) promotes two desired outcomes: it relaxes tense muscles and improves circulation

CRITICAL THINKING EXERCISES

1. What items in the health care environment would you find important in supporting your comfort, rest, and sleep?
2. What actions could a nurse take to promote sleep among clients in a hospital or other types of health care facility such as a nursing home?
3. Discuss possible effects of suffering from or living with a person who has a sleep disorder.
4. Explain why nursing interventions that promote sleep may be preferable to administering a medication that promotes sleep.

Infection Control

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Explain the meaning of infectious diseases.
2. Differentiate between infection and colonization.
3. Define infection control measures.
4. Name two major techniques for infection control.
5. Identify three new elements of standard precautions.
6. Discuss situations in which nurses use standard precautions and transmission-based precautions.
7. Describe the rationale for using airborne, droplet, and contact precautions.
8. Explain the purpose of personal protective equipment (PPE).
9. Discuss the rationale for removing PPE in a specific sequence.
10. Explain how nurses perform double bagging.
11. List two psychological problems common among clients with infectious diseases.
12. Provide at least three teaching suggestions for preventing infections.

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Infection Control

- Infectious diseases (diseases spread from one person to another) are also called contagious or communicable diseases and community acquired infections.
- Colonization: condition that results when microbes are present but host is without signs or symptoms of infection.
- Incubation period: Infectious agent reproduces, but there are no recognized symptoms.
- The infectious agent may, however, exit the host at this time and infect others.

Infection

- Infection is a condition that results when microorganisms cause injury to a host.
- The host can transmit pathogens and infectious diseases to others.

Infection Control Precautions

- **Infection control precautions** are physical measures designed to curtail the spread of infectious diseases. They are essential when caring for clients. Infection control precautions require knowledge of the mechanisms by which an infectious disease is transmitted and the methods that will interfere with the chain of infection.
- The Centers for Disease Control and Prevention (1996, 2005) have established guidelines for two major categories of infection control precautions: standard precautions and transmission-based precautions.

Standard Precautions

- Standard precautions are measures for reducing the risk for microorganism transmission from both recognized and unrecognized sources of infection. Health care personnel follow standard precautions when caring for all clients, regardless of diagnosis or infection status.
- This precautionary system combines methods previously known as *universal precautions.*
- Health care personnel follow standard precautions whenever there is the potential for contact with the following:
  - Blood
  - All body fluids except sweat, regardless of whether or not they contain visible blood
  - Nonintact skin
  - Mucous membranes

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Standard Precautions

Handwashing

- Wash hands after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn.
- Wash hands immediately after gloves are removed, between patient contacts, and when otherwise indicated; wash between tasks and procedures on the same patient to prevent cross-contamination of different body sites.
- Use plain (non-antimicrobial) soap for routine handwashing.
- Use an antimicrobial agent or a waterless antiseptic agent to control outbreaks or hyperendemic infections (highly infectious in all age groups)

Gloves

- Wear clean, nonsterile gloves when touching blood, body fluids, secretions, excretions, and contaminated items.
- Change gloves between tasks on the same patient after contact with material that may contain a high concentration of microorganisms.
- Remove gloves and wash hands immediately before caring for another patient.

Mask, Eye Protection, Face Shield

- Wear a mask and eye protection, or face shield to protect the eyes, nose, and mouth when there is a likelihood that splashes or sprays of blood, body fluids, secretions, or excretions will occur.

Gown

- Wear a clean, nonsterile gown when there is a likelihood that splashes or sprays of blood, body fluids, secretions, or excretions will occur.
- Remove a soiled gown promptly and wash hands.

Patient-Care Equipment

- Handle equipment soiled with blood, body fluids, secretions, and excretions so as to prevent the transfer of microorganisms to oneself, others, or the environment.
- Ensure that soiled reusable equipment is cleaned before another subsequent use.
- Discard soiled single-use equipment properly.

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Environmental Control

- Ensure that procedures for routine cleaning and disinfection of environmental surfaces, beds, bedrails, bedside equipment, and other frequently touched surfaces are carried out.

Linen

- Handle, transport, and process soiled linen in such a way as to prevent exposure to oneself, others, and the environment.

Occupational Health and Blood-borne Pathogens

- Prevent injuries when using needles, scalpels, and other sharp devices
- Never recap used needles
- Use either a one-handed "scoop" method or mechanical device for covering a needle.
- Place all disposable sharp items in a puncture-resistant container as close to the location of use as possible; transport reusable syringes and needles in a puncture-resistant container for reprocessing.
- Use mouthpieces, resuscitation bags, or other ventilation devices as an alternative to mouth-to-mouth resuscitation methods in areas where the need for resuscitation is predictable.

Patient Placement

- Place a patient who contaminates the environment, who does not—or cannot be expected to—assist in maintaining appropriate hygiene or environmental control in a private room.
- Consult with an infection control professional concerning alternatives if a private room is not available.
- Place a client who contaminates the environment, who does not—or cannot be expected to—assist in maintaining appropriate hygiene or environmental control in a private room.

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Transmission-Based Precautions

Transmission-based precautions are measures for controlling the spread of infectious agents from clients known to be or suspected of being infected with highly transmissible or epidemiologically important pathogens.

They are also called the three types of transmission-based precautions.

- Airborne precautions
- Droplet precautions
- Contact precautions.

These three types replace the earlier categories of strict isolation, contact isolation, respiratory isolation, tuberculosis isolation, enteric precautions, and drainage/secretion precautions.

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TABLE 22-2 Transmission-Based Precautions

TYPE OF PRECAUTION	CLIENT PLACEMENT	PROTECTION	EXAMPLES OF DISEASES
Airborne	Private room or in a room with a similarly infected client Negative air pressure[a] Six to 12 air changes per hour Discharge of room air to environment or filtered before being circulated	Follow standard precautions. Keep door closed; confine client to room. Wear a mask for trapping airborne pathogens, such as N95 respirator or Powered Air Purifying Respirator in the case of tuberculosis (TB). Place a mask on the client if transport is required.	Pulmonary TB Measles (rubeola) Chickenpox (varicella) Severe acute respiratory syndrome (SARS)
Droplet	Private room or in a room with a similarly infected client or one in which there are at least 3 ft. between other clients and visitors.	Follow standard precautions. Leave door open or closed. Wear a mask when entering the room depending on agency policy but always when within 3 ft. of the client. Place a mask on the client if transport is required.	Influenza Rubella Streptococcal pneumonia Meningococcal meningitis Whooping cough
Contact	Private room or in a room with similarly infected client or consult with an infection control professional if the previous options are not available	Follow standard precautions. Don gloves before entering the room. Change gloves during client care after contact with infective material that contains high concentrations of microorganisms. Remove gloves before leaving the room. Perform handwashing or perform an alcohol-based handrub with an antimicrobial agent immediately after removing gloves. Do not touch potentially contaminated surfaces or items in the immediate environment after glove removal and handwashing. Wear a gown when entering the room if there is the possibility that your clothing will touch the client, environmental surfaces, or items in the room, or if the client is incontinent or has diarrhea, an ileostomy, a colostomy, or wound drainage not contained by a dressing. Remove the gown before leaving the environment. Avoid transporting the client but, if transport is required, use precautions that minimize transmission. Clean bedside equipment and client care items daily. Use items such as a stethoscope, sphygmomanometer, and other assessment tools exclusively for the infected client; clean and disinfect them before use for another client.	Gastrointestinal, respiratory, skin, or wound infections that are drug resistant Gas gangrene Acute diarrhea Acute viral conjunctivitis Draining abscess

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Airborne Precautions

- Airborne precautions are measures that reduce the risk for transmitting airborne infectious agents. They block pathogens 5 microns or smaller that are present in the residue of evaporated droplets that remain suspended in the air, as well as those attached to dust particles.
- Tuberculosis (TB) is an example of a disease transmitted in the air.

FIGURE 22-3 (A) An N95 respirator must fit tightly around the mouth and nose with straps that attach it to the head. A secure seal is evidenced by a slight bulging on exhalation and slight collapse upon inhalation. (B) A powered air purifying respirator uses a blower to remove contaminated air through a filter and supplies purified air to a facepiece.

Droplet Precautions

- Droplet precautions are measures that block pathogens within moist droplets larger than 5 microns. They are used to reduce pathogen transmission from close contact (usually 3 feet or less) between an infected person or a person who is a carrier of a droplet-spread microorganism and others.

- Microorganisms carried on droplets commonly exit the body during coughing, sneezing, talking, and procedures such as airway suctioning (see Chap. 36) and bronchoscopy. Airborne precautions are not used because droplets do not remain suspended in the air.

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Contact Precautions

- Contact precautions are measures used to block the transmission of pathogens by direct or indirect contact. This is the final category of transmission-based precautions. Direct contact involves skin-to-skin contact with an infected or colonized person.
- Indirect contact occurs by touching a contaminated intermediate object in the client's environment. Additional precautions are necessary if the microorganism is antibiotic resistant

Infection Control Measures

Infection control measures involve the use of personal protective equipment (garments that block the transfer of pathogens from one person, place, or object to oneself or others) and techniques that serve as barriers to transmission.

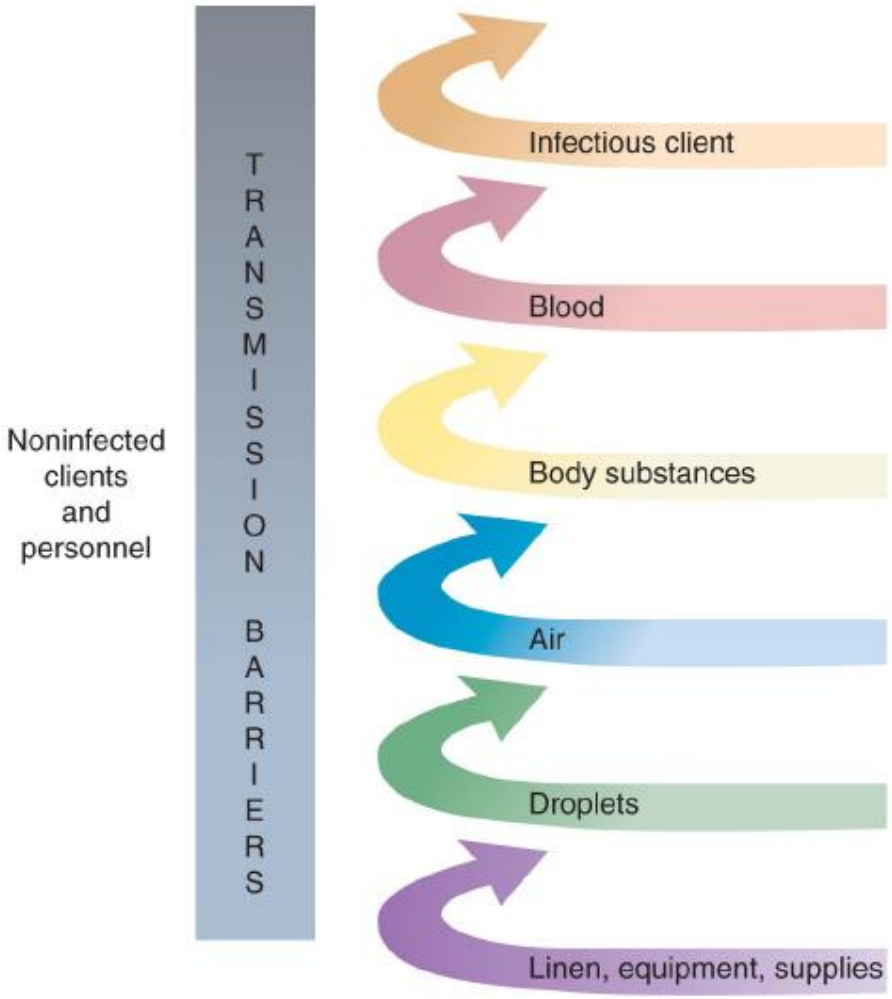

FIGURE 22-4 Blocking sources of infectious disease transmission.

Disposing of contaminated linen, equipment, and supplies in such a way that nurses do not transfer pathogens to others

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Using infection control measures to prevent pathogens from spreading when transporting laboratory specimens or clients

1. Client Environment

The client environment includes the room designated for the care of a client with an infectious disease and the equipment and supplies essential to controlling transmission of the pathogens

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Infection Control Room

- Most health care agencies assign infectious or potentially infectious clients to private rooms.
- They keep the door to the room closed to control air currents and the circulation of dust particles.
- The room has a private bathroom so that personnel can flush contaminated liquids and biodegradable solids. A sink is also located in the room for hand washing.
- Staff members post an instruction card stating that isolation precautions are required on the door or nearby at eye level.
- Nurses are responsible for teaching visitors how to comply with the infection control measures.

Equipment and Supplies

- The infection control room contains the same equipment and supplies as any other hospital room, with a few modifications. Equipment that personnel would ordinarily use for several noninfected clients, such as a stethoscope and sphygmomanometer, remains in the client's room whenever possible. This prevents the need to clean and disinfect the items each time they are removed.
- For the same reason, disposable thermometers are preferred. Personnel disinfect electronic or tympanic thermometers to make them safe for the next client.
- Items such as a container for soiled laundry, lined waste containers, and liquid soap dispensers are also placed in the room.

2. Personal Protective Equipment.

- Infection control measures involve the use of one or more items for personal protection. Personal protective equipment, also called barrier garments, includes gowns, masks, respirators, goggles or face shields, and gloves.
- These items are located just outside the client's room or in an anteroom.

Removing Personal Protective Equipment

The procedure involves making contact between two contaminated surfaces or two clean surfaces. Nurses remove the garments that are most contaminated first, preserving the clean uniform underneath (Figure 22-8)

Disposing of Contaminated Linen, Equipment, and Supplies

FIGURE 22-9 Removing and disposing the most contaminated garments first. (Photo by B. Proud.)

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FIGURE 22-6 Containing soiled laundry. (Photo by B. Proud.)

Double-bagging is an infection control measure in which one bag of contaminated items, such as trash or laundry, is placed within another .

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Removing Reusable Items

They are cleaned with an antimicrobial disinfectant, bagged, and sterilized using heat or chemicals (see Chap. 10).

Transporting Clients

- During transport, nurses use methods to prevent the spread of pathogens either directly or indirectly from the client.
- The client wears a mask or particulate air filter respirator if the pathogen is transmitted by the airborne or droplet route. Any hospital personnel having direct contact with the client use personal protective equipment similar to that used in client care.

Psychological Implications

Although infection control measures are necessary, they often leave clients feeling shunned or abandoned. Clients with infectious diseases continue to need human contact and interaction.

Promoting Social Interaction

Nurses encourage visitors to come as often as the agency's policies and the client's condition permit. They use every opportunity to emphasize that as long as visitors follow the infection control precautions, they are not likely to acquire the disease.

Combating Sensory Deprivation

Sensory deprivation results when a person experiences insufficient sensory stimulation or is exposed to sensory stimulation that is continuous and monotonous.

Nursing Implications

Risk for Infection

Ineffective Protection

Risk for Infection Transmission

Impaired Social Interaction

Social Isolation

Risk for Loneliness

Deficient Diversional Activity

Powerlessness

Fear

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Critical Thinking Exercises

1. Give some reasons why controlling the spread of infectious diseases is difficult among children cared for in day-care centers.

2. What action(s) is/are appropriate to take if there are several residents in a long-term care facility who acquire an infection with a transmittable pathogen and there are not enough private rooms to relocate them?

Nclex-Style Review Questions

1. When a nurse empties the secretions from a wound suction container, which of the following personal protective measures is most important at this time?

1. Wear a mask.
2. Wear a gown.
3. Wear goggles.
4. Wear gloves.

Test-Taking Strategy: Note the key word and modifier, “most important.” Analyze the choices and select the option that identifies a primary barrier from body fluid that may contain a pathogen.

2. When a person comes to the emergency department with respiratory symptoms, which of the following infection control measures is appropriate to use initially?

1. Contact precautions
2. Airborne precautions
3. Respiratory hygiene/cough etiquette
4. Droplet precautions

Test-Taking Strategy: Note the key word, “initially.” Analyze the choices and select the option that is appropriate to use at the first point of encounter with a client with a possible infectious respiratory condition.

3. When exiting the room of a client being cared for with contact precautions, arrange the steps in the order in which personal protection items are removed. Use all the options.

1. Take off the mask or particulate air respirator.
2. Untie and remove the gown.
3. Remove gloves one at a time.
4. Remove goggles, if worn.

Test-Taking Strategy: Analyze the choices and select the personal protection items from most contaminated to least contaminated.

4. What is the best advice the nurse can give to someone who is allergic to latex, yet must wear gloves for standard precautions?

1. Rinse the latex gloves with running tap water before donning them.
2. Apply a petroleum ointment to both hands before donning latex gloves.
3. Eliminate wearing gloves, but wash both hands vigorously with alcohol afterward.
4. Wear two pairs of vinyl gloves if there is a potential for contact with blood or body fluid.

Test-Taking Strategy: Analyze the choices and select the option that offers protection from contact with a pathogen and allergen.

5. Other than obtaining an immunization against influenza, what is the best advice the nurse can give to high-risk people to avoid acquiring this infection?

1. Consume adequate vitamin C.
2. Avoid going to crowded places.
3. Dress warmly in cold weather.
4. Reduce daily stress and anxiety.

Test-Taking Strategy: Note the key word and modifier, “best advice.” Analyze the choices and select the one that is better than any of the others at preventing the potential for acquiring a respiratory infection like influenza.

Hygiene

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Define hygiene.
2. Name five hygiene practices that most people perform regularly.
3. Give two reasons why a partial bath is more appropriate than a daily bath for older adults.
4. List at least three advantages of towel or bag baths.
5. Name two situations in which shaving with a safety razor is contraindicated.
6. Name three items recommended for oral hygiene.
7 . Identify two methods to prevent the chief hazard when providing oral hygiene to an unconscious client.
8. Describe two techniques for preventing damage to dentures during cleaning.
9. Describe two methods for removing hair tangles.
10. Name two types of clients for whom nail care is provided with extreme caution.
11. Name four visual and hearing devices.
12. List two alternatives for clients who cannot insert or care for their own contact lenses.
13. Discuss four reasons for sound disturbances experienced by people who wear hearing aids.

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Hygiene

Hygiene: practices that promote health through personal cleanliness

Activities that foster hygiene:

1. Bathing; cleaning and maintaining fingernails and toenails
2. Performing oral care
3. Shampooing and grooming hair
4. Maintaining hearing aids and eyeglasses

Integumentary System

Most hygiene practices are based on maintaining or restoring a healthy integumentary system.

Integumentary System Components

1. Skin
2. Mucous membrane
3. Hair
4. Fingernails, toenails
5. Teeth

Skin

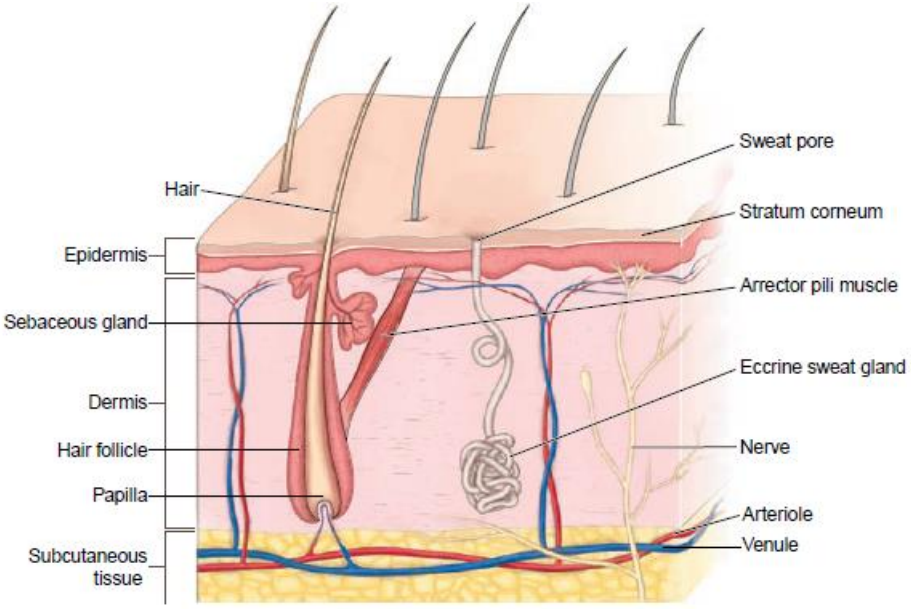

FIGURE 17-1 A cross-section of the skin.

Skin layers:

1. Epidermis
2. Dermis
3. Subcutaneous layer

Function:

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1. Protection.
2. Regulate temperature.
3. Fluids and chemical balance.
4. Sensation.
5. Assist in vitamin D synthesis.

Mucous Membrane

- Line body passages such as the digestive, respiratory, urinary, and reproductive systems
- Mucous membrane also lines the conjunctiva of the eye
- Goblet cells in the mucous membranes secrete mucus, a slimy substance that keeps the membranes soft and moist

Hair

- Is a thread of keratin
- Forms from cells at the base of a single follicle
- Helps to prevent heat loss
- Sebaceous glands in the hair follicles release sebum, an oily secretion

Nails

- Fingernails and toenails are made of keratin, which in concentrated amounts gives them their tough texture
- Normal nails are thin, pink, and smooth
- Fingernails and toenails provide some protection to the digits

Teeth

- Present beneath the gums at birth
- Contain the outer covering, enamel, a keratin structure
- Exposed portion of each tooth: crown
- Portion within the gum: root
- Adults: 28 to 32 permanent teeth
- The integrity of the teeth depends on oral hygiene practice, diet and general health
- Saliva: keeps the teeth clean and inhibits bacterial growth

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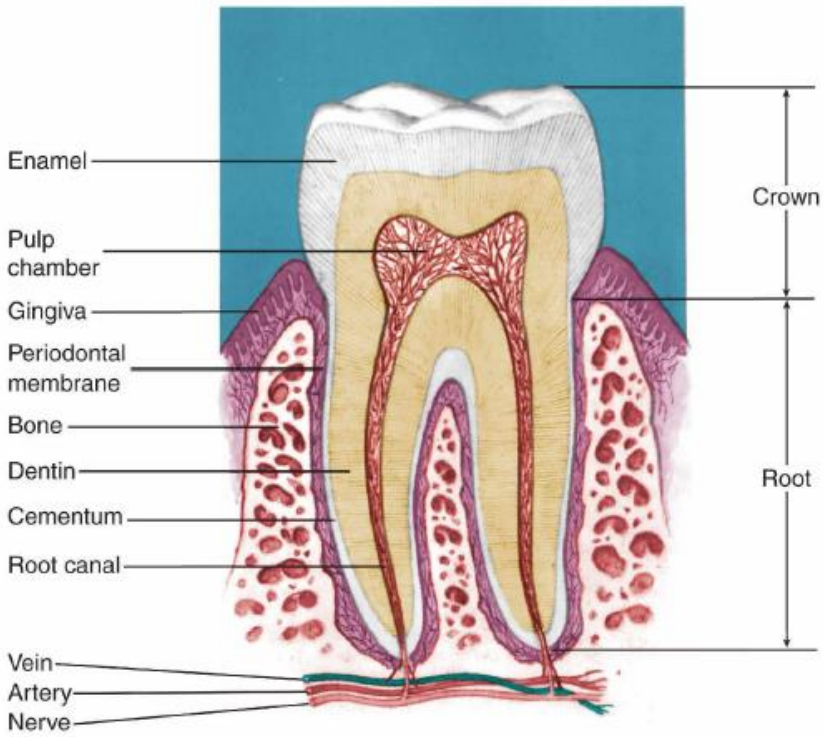

FIGURE 17-4 A cross-section of a tooth. (From Cohen, B. [2010]. *Medical terminology: An illustrated guide* [4th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins.)

Common Dental Problems

- Sugar, plaque, and bacteria may eventually erode the tooth enamel, causing caries
- Tartar leads to gingivitis while gum inflammation may cause periodontal disease

Hygiene practices

Bathing

Uses a cleansing agent such as soap and water to remove sweat, oil, dirt, and microorganisms from the skin

Advantages of bathing

1. Eliminates body odor.
2. Reduces the potential for infection
3. Stimulates circulation.
4. Provides a refreshed and relaxed feeling.
5. Improves self-image

Types of Bathing according to hygiene purposes

1. **Tub bath or shower:** There is no contraindication
2. **Partial bathing:** washing only those body areas subject to greatest soiling or that are sources of body odor.
3. **For those who are dependent persons**
    1. **Bed bath**(washing with a basin of water at the bedside)
    2. **Towel bath :** The nurse uses a single large towel to cover and wash a client
    3. **Bag bath** : disposable cloths in a plastic bag or container

Types of Bathing according to function

1. **Sitz bath:** Immersion of buttocks and perineum in a small basin of continuously circulating water (as in case of piles or episiotomy)

purposes:

- Remove blood, serum, stool or urine
- Reduce local swelling.
- Relieves discomfort.

2. **Sponge bath: application of tipped water to the skin.**

purposes:

- Reduces a fever.

3. **Medicated bath:** soaking or immersing in a mixture of water and another substance, such as (sodium bicarbonate)

purposes:

- Relieve itching or rashes

4. **Whirlpool bath:** warm water that is continuously agitated within a tub or tank

purposes:

- Improve circulation.
- Increase joint mobility.
- Remove dead tissue
- Relieve discomfort.

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TABLE 17-2 Therapeutic Baths

TYPE	DESCRIPTION	PURPOSE
Sitz bath	Immersion of the buttocks and perineum in a small basin of continuously circulating water	Removes blood, serum, stool, or urine Reduces local swelling Relieves discomfort
Sponge bath	Applications of tepid water to the skin	Reduces a fever
Medicated bath	Soaking or immersing in a mixture of water and another substance, such as baking soda (sodium bicarbonate), oatmeal, or cornstarch	Relieves itching or a rash
Whirlpool bath	Warm water that is continuously agitated within a tub or tank	Improves circulation Increases joint mobility Relieves discomfort Removes dead tissue

Bathing

- Ask the client if he or she uses special soap, lotion, or other hygiene products. Determining the client's preferences individualizes care.
- Wear gloves if there is any potential for direct contact with blood, drainage, or other body fluid. Gloves reduce the potential for acquiring an infection.
- Keep the client covered during the bath. Covering the client demonstrates respect for modesty.
- Wash cleaner areas of the body first and dirtier areas last. This reduces the spread of microorganisms.
- Encourage the client to participate at whatever level is appropriate. Participation promotes independence and self-esteem.
- Monitor the client's tolerance of activity. If activity becomes too strenuous, it should be discontinued and resumed later.
- Inspect the body during washing for skin disorders. Bathing provides an excellent opportunity for physical assessment.
- Communicate with the client and use the occasion to do informal health teaching. Talking demonstrates respect for the client as a person rather than an object being washed; teaching promotes health.
- Wash one part of the body at a time. Exposing only one part prevents chilling.
- Place a towel under the part of the body being washed. A towel absorbs moisture.
- Use firm but gentle strokes. Gentle strokes avoid friction that can damage the skin.
- Wash and dry well between folds of skin. Effective washing removes debris and microorganisms from areas where they are apt to breed.
- Keep the washcloth wet, but not so wet that it drips. This demonstrates concern for the client's comfort.
- Wash more soiled areas, such as the anus, last. Doing so prevents transferring microorganisms to cleaner areas of the body.

- Remove all soap residues. This prevents drying of the skin and possible itching.
- Dry the skin after it has been rinsed. Drying the skin prevents chilling.
- Replace the water as it cools. Using warm water shows concern for the client's comfort.
- Apply an emollient lotion to the skin after bathing. A lotion restores lubrication to the skin.
- Document the procedure in patient records.

Advantages of Towel or bag Bath

- Reduce the potential for skin impairment because the non-rinsible cleanser lubricates rather than dries the skin
- Prevent the transmission of microorganisms that may be growing in wash basins.
- Reduce the spread of microorganisms from one part of the body to another because separate cloths or regions of the towel are used.
- Preserve the integrity of the skin because friction is not used while drying the skin.
- Promote self-care among clients who may lack the strength or dexterity to wet, wring, and lather a washcloth.
- Save time compared to conventional bathing.
- Promote comfort because the moist towel or cloths are used so quickly, and they are warmer when applied.

Shaving

- Removes unwanted body hair
- Accomplished with an electric or a safety razor

Use of safety razor is contraindicated for those clients:

1. Receiving anticoagulant.
2. Receiving thrombolytic agents.
3. Taking high doses of aspirin.
4. With blood disorders as hemophilia.
5. With liver disease who have impaired clotting.
6. With rashes or inflamed skin.
7. Who are suicidal.

For those we use an electric or battery–operated razor

Shaving clients

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- Prepare a basin of warm water, soap, a face cloth, and a towel. These supplies are necessary for wetting, rinsing, and lathering the face (or other area that requires shaving).
- Wash the skin with warm, soapy water.
- Lather the skin with soap or shaving cream.
- Start at the upper areas of the face (or other area that requires shaving; and work down. This progression provides more control of the razor.
- Pull the skin taut below the area to be shaved. This evens the level of the skin.
- Pull the razor in the direction of hair growth.
- Use short strokes. They provide more control of the razor.
- Rinse the razor after each stroke or as hair accumulates.
- Rinse the remaining soap or shaving cream from the skin.
- Apply direct pressure to areas that bleed, or apply alum sulfate (styptic pencil) at the site of bleeding.
- Apply aftershave ' 'ion, cologne, or cream to the shaved area if the client desires it. The alcohol in lotion and cologne reduces and retards microbial growth in the tiny abrasions caused by the razor; cream restores oil to the skin.

Tooth Brushing and Flossing

- Clients who are alert and physically capable generally attend to their own oral hygiene. For clients confined to a bed, the nurse assembles the necessary items as toothbrush, toothpaste, a glass of water, an emesis basin, and floss.
- Although conscientious oral hygiene does not prevent dental problems completely, it reduces the incidence of tooth and gum disease. Therefore, clients need to learn how to maintain the structure and integrity of their natural teeth

Oral Care for Unconscious Clients

- Oral hygiene cannot be neglected because the client is unconscious. In fact, because unconscious clients are not salivating in response to seeing, smelling, and eating food, they need oral care even more frequently than conscious clients.
- Tooth brushing is the preferred technique for providing oral hygiene to unconscious clients
- Clients who are not alert, however, are at risk for aspirating (inhaling) saliva and liquid oral hygiene products into their lungs.
- Aspirated liquids predispose clients to pneumonia. Therefore. the nurse uses special precautions to avoid getting fluid in the client airway

Hair Care

- Sometimes, clients need assistance with grooming or shampooing their hair.

Hair Grooming

- Try to use a hairstyle the client prefers.
- Brush the hair slowly and carefully to avoid damaging the hair.
- Brush the hair to increase circulation and distribution of sebum.
- Use a wide-toothed comb, starting at the ends of the hair rather than from the crown downward if the hair is matted or tangled.
- Apply a conditioner or alcohol to loosen tangles.
- Use oil on the hair if it is dry. Many preparations are available, but pure castor oil. olive oil, and mineral oil are satisfactory.
- Braid the hair to help prevent tangles.
- If hair loss occurs from cancer therapy or some other disease or medical treatment, provide the client with a turban or baseball cap.
- Avoid using hairpins or clips that may injure the scalp.
- Obtain the client's or family's permission before cutting the hair if it is hopelessly tangled and cutting seems to be the only solution to provide adequate grooming.

Nail Care

- Keeping the fingernails and toenails clean and trimmed
- Nail care should be provided with extreme caution for the following clients:
  - Clients with diabetes
  - Clients with impaired circulation
  - Client with thick nails

Visual and Hearing Devices

- Eyeglasses and hearing aids improve communication and socialization
  - Eyeglasses
  - Contact lenses
  - Artificial eyes
  - Hearing aids
  - Infrared listening devices

Examples of Hearing Aids

- In the ear
- Behind the ear
- Remote controlled

Critical Thinking Exercises

1. You have been assigned to two clients: a 75-yearold woman who is unconscious after a stroke and a 38-year-old male mechanic being treated for an ulcer. How do their hygiene needs differ?

2. You are responsible for inspecting long-term care facilities such as nursing homes. What criteria should health care agencies meet in relation to bathing facilities and hygiene policies to receive a positive evaluation?

3. Explain why attending to shaving, oral hygiene, and nail care are important to families of those being cared for in a long-term care facility.

4. What strategies might a nurse use for meeting the hygiene needs of a client who refuses to bathe and perform oral care?

Admission, Discharge, Transfer, and Referrals

Learning Objectives

On completion of this chapter, the students should be able to:

1. List four major steps involved in the admission process.
2. Identify four common psychosocial responses when clients are admitted to a health agency.
3. List the steps involved in the discharge process.
4. Give three examples of the use of transfers in client care.
5. Explain the difference between transferring clients and referring clients.
6. Describe three levels of care that nursing homes provide.
7. Identify two contributing factors to the increased demand for home health care.

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Admission

- Entering a health care agency for nursing care and medical or surgical treatment

Admission Process

Admission involves:

- Authorization from a physician that the person requires specialized care and treatment.
- Collection of billing information by the admitting department of the health care agency
- Completion of the agency's admission data base by nursing personnel
- Documentation of the client's medical history and findings from physical examination
- Development of an initial nursing care plan
- Initial medical orders for treatment
- Medical authorization: Before admission, a physician determines whether a client's condition requires special tests, technical care, or treatment.
- The admitting department: Clerical personnel begin to gather information from the prospective client or his or her family.
- Preliminary data collected: Client's address, place of employment (if the client works), insurance carrier, Medicare information, and other per-sonal data.
- Addressograph plate: They deliver the form, initiated in the admitting department to the nursing unit along with a plastic card.

Nursing Admission Activities

- Preparing the client's room: When the admissions department informs the nursing unit that the client is about to arrive, nurses check the room to ensure it is clean and stocked with basic equipment
- Welcoming the client: One of the most important steps in admission is to make the client feel welcome.
- Orienting the client: Helping a person become familiar with a new environment:
    - The location of the nursing station, toilet, shower or bath-ing area
    - Where to store clothing and personal items
    - How to call for nursing assistance from the bed and bathroom
    - How to adjust the hospital bed
    - How to regulate the room lights
    - How to use the telephone
    - How to operate the television
    - The daily routine such as meal times

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- When the doctor usually visits
- When surgery is scheduled
- When laboratory or diagnostic tests are performed

- Safeguarding valuables and clothing: the nurse give some items such as valuable jewelry, and large sums of money, to family members to take home. If this is not pos-sible, *the nurse must carefully observe the agency's policies.* He or she notes in the medical record the type of valuables and how they have been safeguarded
- Helping the client undress: Provides privacy.
- Compiling the nursing data base: start data base assessment
- Initial Nursing Plan for Care: Once all admission data are collected, the nurse develops an initial plan for the client's care as soon as possible but no later than 24 hours following admission
- Medical Admission Responsibilities: The nurse notifies the physician once the admission proce-dure is completed.

Psychosocial Responses on Admission

- Anxiety and fear: An uncomfortable feeling caused by insecurity
- Decisional conflict
- Situational low self-esteem
- Powerlessness
- Social isolation
- Risk for ineffective therapeutic regimen management
- Loneliness.
- Decrease privacy
- Loss of identity

Types of Admissions

TABLE 11-1 Types of Admissions

TYPE	EXPLANATION	EXAMPLE
Inpatient	Length of stay generally more than 24 hours	Acute pneumonia
Planned (nonurgent)	Scheduled in advance	Elective or required major surgery
Emergency admission	Unplanned; stabilized in emergency department and transferred to nursing care unit	Unrelieved chest pain, major trauma
Direct admission	Unplanned; emergency department bypassed	Acute condition such as prolonged vomiting or diarrhea
Outpatient	Length of stay less than 24 hours; possible return on a regular basis for continued care or treatment	Minor surgery, cancer therapy, physical therapy
Observational	Monitoring required; need for inpatient admission determined within 23 hours	Head injury, unstable vital signs, premature or early labor

The Discharge Process

- Discharge is the termination of care from a health care agency
- Discharge planning: is a process that improves client out-comes by:
  - Predetermining his or her post-discharge needs in a timely manner.
  - Coordinating the use of appro-priate community resources to provide a continuum of care.

Steps in the Discharge Process

- Discharge planning
- Obtaining a written medical order
- Completing discharge instructions
- Notifying the business office: To arrange for insurance.
- Helping the client leave the agency: When all the preliminary business is complete, the nurse helps the client gather his or her belongings, plan for trans-portation, and actually leave the agency.
- Writing a summary of the client's condition at discharge
- Terminal Cleaning: Except in unusual circumstances, housekeeping personnel prepare the client's room for the next admission.

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The Discharge Process

One discharge planning technique involves using the acronym **METHOD** as a guide

TABLE 11-2 The METHOD Discharge Planning Guide

TOPIC	NURSING ACTIVITY	EXAMPLE
M—Medications	Instruct the client about drugs that will be self-administered	Insulin
E—Environment	Explore how the home environment can be modified to ensure the client's safety	Remove scatter rugs
T—Treatments	Demonstrate how to perform skills involved in self-care and provide opportunities for returning the demonstration	Dressing changes
H—Health teaching	Identify information that is necessary for maintaining or improving health	Signs and symptoms of complications
O—Outpatient referral	Explain what community services are available that may ease the client's transition to independent living	Physical therapy
D—Diet	Arrange for the dietitian to provide verbal and written instructions on modifying or restricting certain foods or suggestions for altering their methods of preparation	Low-fat diet

The Transfer Process

- Transfer: discharging a client from one unit or agency; admitting him or her to another without going home in the interim
- Transfers are used when there is a need to:
  - Facilitate more specialized care in a life-threatening situation
  - Reduce health care costs
  - Provide less intensive nursing care

Steps Involved in Transfer

- Informing client and family about the transfer
- Completing a transfer summary
- Speaking with a nurse on the transfer unit to coordinate the transfer
- Transporting the client and his or her belongings, medications, nursing supplies, and chart to the other unit

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The Referral Process

- A referral is the process of sending someone to another person or agency for special services
- Referrals generally are made to private practitioners or community agencies

Home Health Care

- Health care provided in the home by an employee of a home health agency
- Home care nursing services
  - Help shorten time spent recovering in hospital
  - Prevent admissions to extended care facilities
  - Reduce readmissions to acute care facilities
- Factors contributing to the increased demand for home health care:
  - Outcome of limitations imposed by Medicare and insurance companies on number of hospital and nursing home days for which they reimburse care
  - Growing number of chronically ill older adults in need of assistance

Critical Thinking Exercises

1. Discuss how the admission of a child might differ from that of an adult.

2. If it becomes apparent that a relative cannot continue to live independently, what options would you pursue?

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Recording and Reporting

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Identify seven uses for medical records.
2. List six components generally found in any client's medical record.
3. Differentiate between source-oriented and problem-oriented records.
4. List at least 10 legally defensible characteristics of written charting.
5. Identify six methods of charting.
6. Explain the purpose and applications associated with the Health Insurance Portability and Accountability Act (HIPAA).
7. List four aspects of documentation required in the medical records of all clients cared for in acute settings.
8. Discuss why it is important to use only approved abbreviations when charting.
9. Explain how to convert traditional time to military time.
10. Identify nursing benefits of electronic documentation.
11. List at least five advantages and disadvantages of an electronic medical record.
12. Identify four written forms used to communicate information about clients.
13. List five ways that health care providers exchange client information other than by reading the medical record.

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Medical Records

- Medical records are written collections of information about a person's health, the care provided by health practitioners, and the client's progress
- Also known as health records or client records

Uses of Medical Records

- **Permanent account**: Requested during subsequent admissions.
- **Sharing information:** Prevents duplication of care and helps reduce the chance of error or omission.
- **Quality assurance:** To maintain a high level of care
- **Accreditation:** Examined during an accreditation visit.
- **Reimbursement:** Payment for hospital cost guided by records.
- **Education and research**: Records serve as an alternative resource for scientific data.
- **Legal evidence:** Each person who makes entries in the client's medical record is responsible for the information he or she records and can be summoned as a witness to testify concerning

JCAHO

- Joint Commission on Accreditation of Healthcare Organizations (JCAHO) establishes criteria reflecting high standards for institutional health care
- Representatives of JCAHO periodically inspect health care agencies and determine evidence of quality care
- Based on inspection, agencies are accredited

Components of Medical Records

- Person's health information
- Care provided by health practitioners
- The client's progress
- The plan for care
- Medication administration record
- Laboratory and diagnostic reports

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Criteria for Legally Defensible Charting

- Ensure that the client's name appears on each page.
- Never chart for someone else.
- Use the specified color of ink and ballpoint pen, or enter data on a computer.
- Date and time each entry as it is made.
- Chart promptly after providing care.
- Make entries in chronologic order.
- Identify documentation that is out of chronologic sequence with the words "late entry."
- Write or print legibly.
- Use correct grammar and spelling.
- Reflect the plan of care.
- Describe the outcomes of care.
- Record relevant details.
- Use only approved abbreviations.
- Never scribble over entries or use correction fluid to obliterate what has been written.
- Draw a single line through erroneous information so that it remains readable, add the date, initial, and then document the correct information.
- Record facts, not subjective interpretations.
- Quote the client's verbal comments.
- Write "duplicate" or "recopied" on documentation that is not original; include the date, time, initials, and reason for the duplication.
- Never imply criticism of another's care.
- Document the circumstances for notifying a physician, the specific data reported, and the physician's recommendations.
- Identify specific information provided when teaching a client and the evidence that indicates the client has understood the instructions. .
- Leave no empty spaces between entries and signature.
- Sign each entry by name and title.

Types of Client Records

1. **Source-Oriented Records**

- Organized according to source of documented information
- Contain separate forms for physicians, nurses, dietitians, physical therapists to make written entries about their specific activities in relation to client's care
- This record provides fragmented documentation

2. **Problem-Oriented Records**

- Organized according to client's health problems
- Four major components: data base, problem list, plan of care, progress notes
- Information compiled and arranged to emphasize goal-directed care; promote recording of pertinent information; facilitate communication among health care professionals

Components of Problem-Oriented Records

TABLE 9-2 Common Components of a Problem-Oriented Record

COMPONENT	DESCRIPTION
Data base	Contains initial health information
Problem list	Consists of a numeric list of the client's health problems
Plan of care	Identifies methods for solving each identified health problem
Progress notes	Describes the client's responses to what has been done and revisions to the initial plan

Methods of Charting

- Narrative charting
- SOAP charting
- Focus charting
- PIE charting
- Charting by exception
- Computerized charting

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Narrative charting

- Narrative charting (the style of documentation generally used in source-oriented records)
- There is no established format for narrative notations.
- Narrative charting is time-consuming to write and read.
- person writing a narrative entry may omit pertinent documentation or include insignificant information.

SOAP charting

- SOAP charting (the documentation style more likely to be used in a problem-oriented record)
- Acquired its name from the four essential components:
  - S = subjective data
  - = objective data
  - A = analysis of the data
  - P = plan for care
- Some agencies have expanded the SOAP format to SOAPIE or SOAPIER (I = interventions, E = evaluation, R = revision to the plan of care
- SOAP charting also helps demonstrate interdisciplinary cooperation

TABLE 9-3 SOAPIER Charting Format

LETTER	EXPLANATION	EXAMPLE OF RECORDING
S = Subjective information	Information reported by the client	S—"I don't feel well."
O = Objective information	Observations made by the nurse	O—Temperature 102.4°F
A = Analysis	Problem identification	A—Fever
P = Plan	Proposed treatment	P—Offer extra fluids and monitor body temperature
I = Intervention	Care provided	I—750 mL of fluid intake in 8 hours; temperature assessed every 4 hours
E = Evaluation	Outcome of treatment	E—Temperature reduced to 101°F
R = Revision	Changes in treatment	R—Increase fluid intake to 1,000 mL per shift until temperature is ≤100°F

Focus Charting

- Modified form of SOAP charting, uses the word focus rather than problem because some believe that the word problem carries negative connotations.
- focus charting follows a DAR model (D = data, A = action, R = response; Fig. 9-2). DAR notations tend to reflect the steps in the nursing process.

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6/30/2007	D(ata) –	Bladder distended 2 fingers above pubis.
1015		Has not urinated in 8 hrs. since
		catheter was removed. ——
	A(ction) –	Assisted to toilet. Water turned on at
		faucet. Instructed to press over bladder
		with hands. ——
	R(esponse) –	Voided 525 mL of clear urine. L. Cass, SN

FIGURE 9-2 Example of DAR charting.

PIE Charting

- Method of recording the client's progress under the headings of:
  - Problem,
  - Intervention,
  - Evaluation
- When nurses use the PIE method, they document assessments on a separate form and give the client's problems a corresponding number.

NURSING NOTES

Date Time	NURSES REMARKS	Signature
6/19	P#1 Crackles heard on inspiration in	
0750	the bases of R and L lungs. ——	
	I#1 Incision splinted with pillow.	
	Instructed to breathe deeply,	
	open mouth, and cough at the	
	end of expiration ——	
	E#1 Lungs clear with coughing.	
	—— A. Walker, LPN	

FIGURE 9-3 Sample of PIE charting.

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Charting by Exception

- Nurses chart only abnormal assessment findings or care that deviates from the standard.
- Proponents of this efficient method say that charting by exception provides quick access to abnormal findings because it does not describe normal and routine information.

Computerized Charting

- Documenting client information electronically.
- charting generally is done by using a portable laptop and keyboard, or touching the monitor screen with a finger or electronic device such as a light pen, data entry by voice activation is on the horizon.

Computerized charting has many advantages:

- The information is always legible.
- It automatically records the date and time of the documentation.
- The abbreviations and terms are consistent with agency- approved lists.
- It eliminates trivia.
- Omissions are fewer because the computer prompts the nurse to enter specific information.
- It saves time because it eliminates delays in obtaining the chart.
- It reduces overtime costs for uncompleted end-of-shift charting.
- Less storage space

FIGURE 9-4 Portable computers allow for point of care documentation. (From Craven, R.F., Hirnle, C.J. *Fundamentals of Nursing* [6th ed.]. Philadelphia: Lippincott Williams & Wilkins.)

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Protecting Health Information

- **HIPAA legislation (Health Insurance Portability and Accountability Act)** protects the rights of U.S. citizens to retain their health insurance
- Requires health care agencies to safeguard written, spoken, and electronic health information
- Health care agencies must obtain authorization from client to release information to family or friends, attorneys, or for other uses
- Submits written notice to all clients identifying uses and disclosures of health information
- Obtains client's signature indicating knowledge of disclosure of information and right to learn who has seen his records
- Limits casual access to identity of client and health information
- Health agencies must ensure protection of electronic data

Beneficial Disclosure

BOX 9-2 Exemptions for Beneficial Disclosures

- Reporting vital statistics (births and deaths)
- Informing the US Food and Drug Administration of adverse reactions to drugs or medical devices
- Disclosing information for organ or tissue donation
- Notifying the public health department about communicable diseases
- Notifying an identified person of a credible threat for imminent harm

Workplace Applications

- Client names on charts no longer visible to public
- All clipboards must obscure private client data, including name
- Whiteboards cannot link client name with diagnosis, procedure, or treatment
- Computer screens not visible to public; flat screen monitors recommended
- Conversations regarding clients must occur in private places
- Fax machines and medical records must be limited to areas inaccessible to public
- Cover sheet on all faxes; emails warning that confidential information being transmitted
- Light boxes (for x-ray, scan results) must be located in private areas
- Documentation must be kept on all with access to client records

Aspects of Documentation

- The type of information recorded
- The people responsible for charting
- The frequency for making entries on the record
- The type of response given for the information recorded

Nursing Documentation

BOX 9-3 Content of Nursing Documentation

Nurses or those to whom they delegate client care are responsible for documenting:

- Assessment data[a]
- Client care needs
- Routine care such as hygiene measures
- Safety precautions that have been used
- Nursing interventions described in the care plan
- Medical treatments prescribed by the physician
- Outcomes of treatment and nursing interventions
- Client activity
- Medication administration
- Percentage of food consumed at each meal
- Visits or consults by physicians or other health professionals
- Reasons for contacting the physician and the outcome of the communication
- Transportation to other departments, like the radiography department, for specialized care or diagnostic tests, and time of return
- Client teaching and discharge instructions
- Referrals to other health care agencies

Abbreviations

- Abbreviations shorten length of documentation and documentation time
- Agencies provide list of approved abbreviations and their meanings
- Use only abbreviations on agency's approved list
- Use JCAHO (Joint Commission on Accreditation of Healthcare Organizations) "Do Not Use" list to avoid and reduce medical errors

Common Abbreviations

TABLE 9-5 Commonly Used Abbreviations

ABBREVIATION	MEANING	ABBREVIATION	MEANING
abd.	abdomen	NSS	normal saline solution
a.c.	before meals	O_2	oxygen
ad lib	as desired	OB	obstetrics
AMA	against medical advice	OOB	out of bed
amt.	amount	OR	operating room
approx.	approximately	per	by or through
b.i.d.	twice a day	P	pulse
BM	bowel movement	p.c.	after meals
BP	blood pressure	p.o.	by mouth
bpm	beats per minute	postop.	postoperative
BRP	bathroom privileges	preop.	preoperative
c̄	with	pt.	patient
C	Centigrade	PT	physical therapy
CCU	coronary care unit	q	every
c/o	complains of	q.i.d.	four times a day
dc	discontinue	q.s.	quantity sufficient
ED	emergency department	R, Rt, or R	right
et	and	R	respirations
H_2O	water	s̄	without
I & O	intake and output	SS	soap suds
IM	intramuscular	stat	immediately
IV	intravenous	t.i.d.	three times a day
kg	kilogram	TPR	temperature, pulse, respirations
L, Lt, or L	left	UA	urinalysis
L	liter	via	by way of
lb	Pound	WC	wheelchair
NKA	no known allergies	WNL	within normal limits
NPO	nothing by mouth	Wt.	weight

Documentation Time

- Traditional time
  - Two 12-hour revolutions; identified with hour and minute, followed by a.m. or p.m.
- Military time
  - Based on 24-hour clock; uses different four-digit number for each hour and minute of the day
    - First two digits indicate hour within 24-hour period
    - Last two digits indicate minutes

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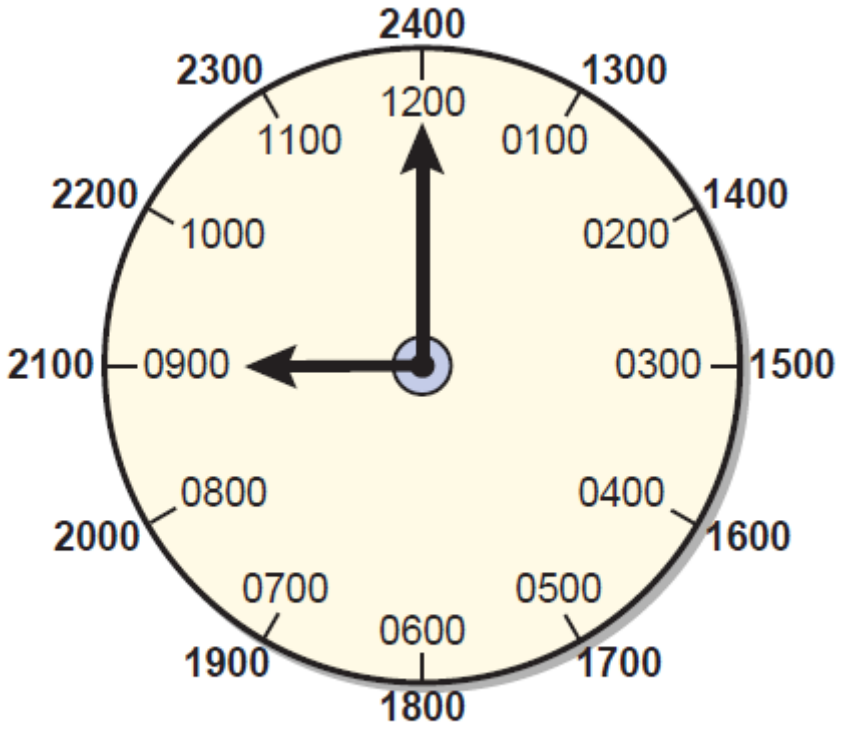

FIGURE 9-6 The military clock uses one 24-hour time cycle instead of two 12-hour cycles (eg, 9:00 AM is 0900 and 9:00 PM is 2100).

TABLE 9-6 Examples of Military Time Conversions

TRADITIONAL TIME	MILITARY TIME
Midnight	0000 or 2400
12:01 AM	0001
1:30 AM	0130
Noon	1200
1:00 PM	1300
3:15 PM	1515
7:59 PM	1959
10:47 PM	2247

Charting Guidelines

- Should not be time-consuming to write and read
- Everyone involved in the care of a client should make entries in the same location in the chart
- The nurse should address specific content in charted progress notes
- Assessments should be documented on a separate form and give the client's problems a corresponding number for quick access

- Abnormal assessment findings, or care that deviates from the standard, should also be documented separately

- Client information should be documented electronically
- Information should always be legible
- Abbreviations and terms should be consistent with agency-approved lists
- The date of the documentation should be recorded
- The time of the documentation should be recorded

Written Forms of Communication

- **Nursing care plan:** list of client's problems, goals, and nursing orders for client care
- **Nursing Kardex**: quick reference for current information about client and client care
- **Checklists:** documentation with check mark or initials
- **Flow sheets:** documentation with sections for recording frequently repeated assessment data

3/10/11 539 Page 001

Stevens, James M 65
MR #: 00310593 Acct #: 9400037290
DR: J. Carrio 2/W 204-01
DX: Unstable angina Date: 3/10/11

SUMMARY : 3/10 0701 to 1501

PATIENT INFORMATION
3/10 ADVANCE DIRECTIVE: No.
Advance directive does not exist
3/10 ORGAN DONOR: Yes
3/10 ADMIT DX: Unstable angina
3/10 MED ALLERGY: None known
3/10 ISOLATION: Standard precautions

MISC. PATIENT DATA

NURSING CARE PLAN PROBLEMS
3/10 Acute pain R/T: anginal pain

ALL CURRENT MEDICAL ORDERS

NURSING ORDERS:
3/10 Activity, OOB, up as tol.
3/10 Routine V/S q & h
3/10 Telemetry
3/10 If 1800 PTT < 50, increase heparin drip to 1200 units/hr. If 50 to 100, maintain 1000 units/hr. If > 100, reduce to 900 units/hr.

DIET:
3/10 Diabetic: 1600 cal., start with lunch today

I.V.s.:
3/10 Peripheral line #1. . . . Start D2W 250 ml with heprin 25,000 units: rate, 1000 units/hr.

(continued)

3/10/11 539 Page 002

Stevens, James M 65
MR #: 00310593 Acct #: 9400037290
DR: J. Carrio 2/W 204-01
DX: Unstable angina Date: 3/10/11

SUMMARY: 3/10 0701 to 1501

SCHEDULED MEDICATIONS:
3/10 Nitroglycerin oint 2%, 1-1/2 inches, apply to chest wall q 8 h, starting on 3/10, 1800 hrs.
3/10 Diltiazem tab 90 mg, #1, P.O., q 6 h 0800, 1400, 2000, 0200
3/10 Furosemide tab 40 mg, #1, P.O., daily 0900
3/10 Potassium chloride tab 10 mEq, #1, P.O. daily 0900
3/10 Labetalol tab 100mg, #1/2, P.O. bid 0900, 1800

STAT/NOW MEDICATIONS:
3/10 Furosemide tab 40 mg, #1, P.O. now
3/10 Potassium chloride tab 10 mEq, #1, P.O., now

PRN MEDICATIONS:
3/10 Procardia nifedipine cap 10 mg, #1, subling. q 6 n, prn SBP > 170 or DSBP > 105
3/10 Acetaminophen tab 325 mg, #2, P.O., q 4 h, prn for pain
3/10 Temazepan cap 15 mg, #1, P.O. q HS, prn
3/10 Alprazolam tab 0.25 mg, #1/2, P.O., q 8 h, prn

LABORATORY:
3/10 CK & MB 1800 today
3/10 CK & MB 0200 tomorrow
3/10 Urinalysis floor to collect
3/10 PTT 1800 today

LABORATORY:
3/10 Stress test persantine, perp H1, Patient handling: Wheelchair, Schedule: tomorrow

Last page

FIGURE 9-8 A computer-generated Kardex. (Used with permission. Holmes, H. N. [Ed.]. [2006]. *Documentation in Action* [pp. 231–232]. Philadelphia: Lippincott Williams & Wilkins.)

Other Forms of Communication

- **Change of shift reports:** Discussion between a nursing spokesperson from the shift that is ending and the arriving personnel
- **Client assignments:** made at the beginning of each shift. Assignments are posted, discussed with team members or written on a worksheet
- **Team conferences:** Conferences are commonly used to exchange information. Topics generally include client care problems
- **Rounds**: visits to clients on an individual basis or as a group
- **Telephone calls:** Use the telephone to exchange information when it is difficult for people to get together
- **SBAR format:** has been recommended as a model for effective communication (Institute for Healthcare Improvement, 2014; Narayan, 2013).

SBAR refers to:

- S (Situation): What is the situation you are calling about.
- B (Background): Pertinent background information related to the situation.
- A (Assessment): What is your assessment of the situation.
- R (Recommendation): Explain what is needed or wanted. If the nurse believes that the physician has not responded in a safe manner to the information given, he or she notifies the nursing supervisor or the head of the medical department.

Safety

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Discuss the purpose of the National Patient Safety goals and methods for implementing them.
2. Give an example of one common injury that predominates during each developmental stage (infancy through older adulthood).
3. Name six injuries that result from environmental hazards.
4. Identify at least two methods for reducing latex sensitization.
5. List four areas of responsibility incorporated into most fire plans.
6. Describe the indications for using each class of fire extinguishers.
7. Discuss five measures for preventing burns.
8. Name three common causes of asphyxiation.
9. Discuss two methods for preventing drowning.
10. Explain why humans are susceptible to electrical shock.
11. Discuss three methods for preventing electrical shock.
12. Name at least six common substances associated with poisonings.
13. Discuss four methods for preventing poisonings.
14. Discuss the benefits and risks of using physical restraints.
15. Explain the basis for enacting restraint legislation and the Joint Commission's accreditation standards.
16. Differentiate between a restraint and a restraint alternative.
17. Give at least four criteria for applying a physical restraint.
18. Describe two areas of concern during an accident.
19. Explain why older adults are prone to falling.

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Safety

- measures that prevent accidents or unintentional injuries
- Major nursing responsibility
- Death from hospital errors: ranked between 5th – 8th leading cause of death by National Center for Health Statistics

TABLE 19-1 Summary of National Patient Safety Goals 2009–2010

GOAL	IMPLEMENTATION
Prevent infection	Follow handwashing and hand antisepsis guidelines recommended by the Centers for Disease Control and Prevention or the World Health Organization.
	Use evidence-based practices to prevent and treat infections.
	Promote influenza and pneumococcal immunizations among institutionalized older adults.
Identify patients/clients correctly	Use at least two methods for identification (for example, the client's name and date of birth) prior to administering medications or performing a treatment such as a blood transfusion.
Improve staff communication	Use only approved abbreviations and symbols.
	Contact appropriate health care providers promptly when a client's health status changes.
	Inform the appropriate person quickly about important test results.
	Repeat or read back verbal and phone orders.
	Discuss a client's care with a subsequent caregiver prior to a transfer.
Use medicines safely	Label all medications that are not already labeled in syringes, cups, and basins; be especially cautious with clients who take medications that thin the blood.
	Confirm that any new medication or medication prescribed in small amounts or for a short time is appropriate to take with current medications.
	Provide a list of the client's current medications to the physician, client, family, and next caregiver prior to the client's discharge.
Identify clients with safety risks	Assess clients who are at risk for falls, suicide, and fires from oxygen administration, and institute precautionary measures.
Prevent pressure ulcers	Determine which clients are at risk for pressure ulcers, develop a plan for their prevention, and reassess periodically.
Prevent surgical errors	Mark the body part intended for surgery; include the client's participation.
	Perform a "time out" to check the client and required documents immediately before a surgical procedure begins.
Involve clients in their care	Inform clients how to report safety issues.

Age-Related Safety Factors

No age group is immune to accidental injury.

Infants

- Infants rely on the safety consciousness of their adult care-takers.
- Falling off changing tables
- Unrestrained in automobiles

Toddlers

- Climbing; accidental poisoning; falling downstairs or from high chairs; burns; electrocution; drowning

School-aged children and adolescents are physically active lead to school-aged children play-related injuries

Adolescents: sports-related injuries without adequate protective equipment

Adults: ignoring safety issues, fatigue, sensory changes, effects of disease

Old adults: Visual impairment, urinary urgency, postural hypotension, reduced coordination, Impaired mobility, inadequate home maintenance and mental confusion

Environmental Hazards

Environmental hazards are potentially dangerous conditions in the physical surroundings. Examples in the home and health care environment

- Latex sensitization
  - Latex sensitization: allergic response to the latex proteins
  - Latex is natural rubber sap
  - Component of many household items
  - Predisposition to latex sensitivity
- Thermal burns
- Asphyxiation
- Electrical shock
- Poisoning
- Falls

Types of latex reactions

- **Contact dermatitis**, a delayed localized skin reaction that occurs within 6 to 48 hours and lasts for several days
- **Immediate hypersensitivity** systemic reaction manifested by swelling, itching, respiratory distress, hypotension, and death in severe cases,
- **Possible cross-reaction to fruits or vegetables** The molecular structure of latex and other plant substances is similar.

Safeguarding Clients and Personnel

- Obtaining an allergy history, and a sensitivity to latex in particular
- Flagging the chart and room door and attaching an allergy- alert identification bracelet on latex-sensitive clients
- Assigning clients with a latex allergy to a private room or latex-safe environment (room stocked with latex-free equipment and wiped clean of glove powder)
- Stocking a latex-safe cart containing synthetic gloves and latex-free client care and resuscitation equipment in the room of a client sensitive to latex
- Communicating with personnel in other departments so that they use nonlatex equipment and supplies during diagnostic or treatment procedures

Burns

Thermal burns or chemical burns

Burn prevention: exits identified, lighted, unlocked; ensure functioning sprinkler system

Fire plans: all employees must know and follow the agency's fire plan:

- Specific roles and responsibilities at and away from the fire's point of origin
- Use of the fire alarm system
- Roles in preparing for building evacuation
- Location and propel use of equipment for evacuation or transporting clients to areas of refuge
- Building compartmentalization procedures for containing smoke and fire

Fire Management

Fire management: **RACE**

  - Rescue
  - Alarm
  - Contain the fire
  - Extinguish
- Evacuate clients from the room with the fire.
- Inform the switchboard operator of the fire's location.
- Return to the nursing unit when an alarm sounds; do not use the elevator.
- Clear the halls of visitors and equipment
- Close the doors to client rooms and stairwells as well as fire doors between adjacent units. Wait for further directions.
- Place moist towels or bath blankets at the threshold of doors if smoke is escaping.

Rescue and Evacuation

The first priority is to rescue clients in the immediate vicinity of the fire. Nurses lead those who can walk to a safe area and close the room and fire doors alter exiting. Nursing personnel evacuate those who cannot walk using a variety of techniques

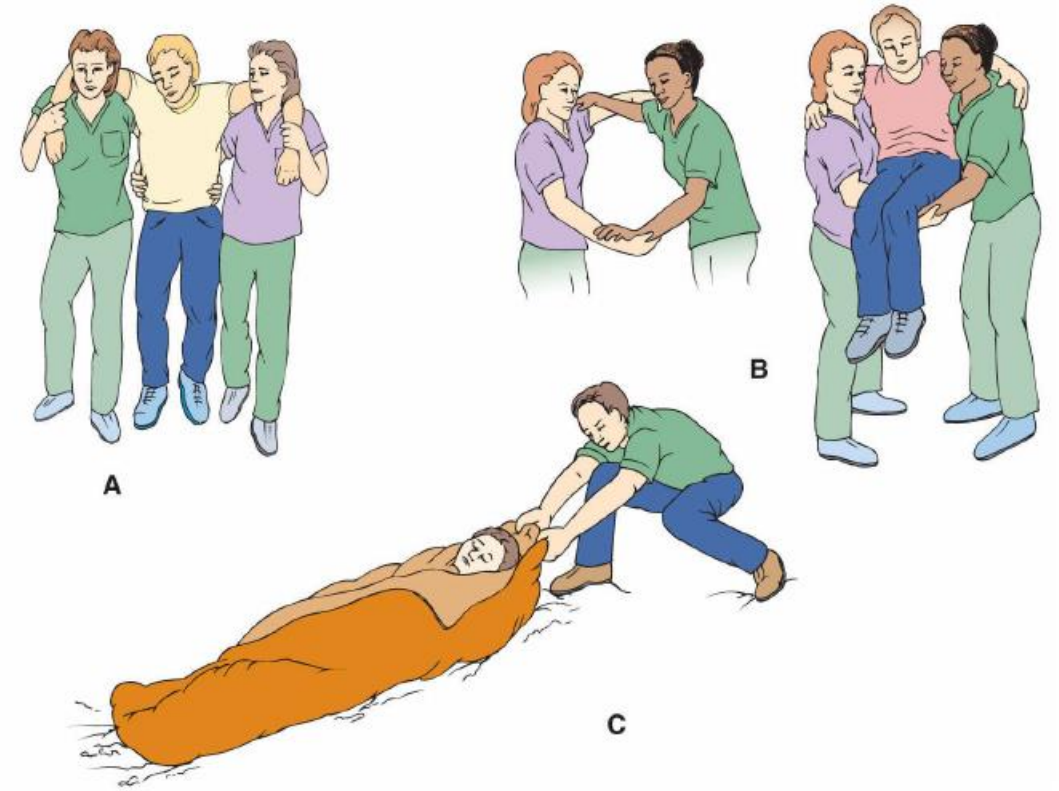

FIGURE 19-7 Evacuation of clients. **(A)** Human crutches—rescuers secure a weak but ambulatory client's arm and waist. **(B)** Seat carry—rescuers interlock arms and carry a nonambulatory client. **(C)** Body drag—rescuer drags an unconscious victim or one who cannot assist on a blanket or sheet.

Fire extinguishers

TABLE 19-4 Types of Fire Extinguishers

TYPE	SYMBOL	CONTENTS	USE
Class A	A	Water under pressure	Burning paper, wood, and cloth
Class B	B	Carbon dioxide	Fires caused by gasoline, oil, paint, grease, and other flammable liquids
Class C	C	Dry chemicals	Electrical fires
Class ABC (combination extinguisher)	A B C	Graphite	Fires of any kind

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Asphyxiation

- Airway obstruction

Carbon monoxide (CO)

- CO binds with hemoglobin
- CO poisoning: symptoms similar to flu, except for cherry-red skin color, Nausea Vomiting Headache Dizziness Muscle weakness

Drowning

- Fluid occupies airway, interferes with ventilation
- Accidental drownings

Resuscitation

- Immediate CPR
- CPR certification in nurses

Electrical shock

Body prone to electric shock

- Macroshock; is a harmless distribution of low amperage electricity over a large area of the body.
- microshock is low-voltage but high-amperage dis tribulion of electricity.
- Grounded equipment reduces electrical shock potential
- Measures to prevent electrical shock

Measures to prevent electrical shock

- Never use an adaptor to bypass a grounded outlet.
- Make sure all outlets and switches have cover plates.
- Plug all machines used for client care into outlets within 12 ft. of one another or within the same cluster of wall outlets.
- Unplug machines if they are no longer necessary.
- Discourage clients from resting electric hairdryers, curling irons, or razors on or near a sink that contains water.
- Do not use a machine that has a frayed or cracked cord or a plug with exposed wires.
- Grasp the plug, not the cord, to remove it from an outlet.
- Do not use extension cords.
- Report macroshocks to the engineering department.
- Clean liquid spills as soon as possible.

- Stand clear of the client and bed during cardiac defibrillation

Poisoning

- Caused by ingestion, inhalation, or absorption of toxic substance
- More common in homes than in health care institutions
- Accidental poisonings; medication errors

Common substance associated with childhood poisonings:

Drugs as aspirin, cleaning agents as bleach, chemical products as glue, cosmetics as hair dye

Poisoning prevention and treatment

Prevention

- Educate children; teach parents
- Cognitive-impaired adults: use prefilled medication containers.

Treatment involves maintaining breathing and cardiac function. After that, rescuers attempt to identify what was ingested, how much, and when. Definitive treatment depends on the substance, the client's condition, and if the substance is still in the stomach.

Falls

Most common accident with the most serious consequences in older adults

Contributing factors:

- visual impairments
- disorders affecting gait, balance, and coordination
- medications to lower blood pressure
- Urinary urgency
- Social, environmental factors
- Accumulation of clutter
- Hospitalization
- Confusion, impaired judgment

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The nurse teaches the client or the family as follows:

- Keep the environment well lit.
- Install and use handrails on stairs inside and outside the home
- Place a strip of light-colored adhesive tape on the edge of each stair for visibility
- Remove scatter rugs.
- Keep extension cords next to the wall.
- Do not wax floors.
- Wear well-fitting shoes that enclose the heel and toe of the foot and have nonskid soles.
- Keep pathways clutter free.
- Wear short robes without cloth belts that may loosen and trip the client
- Use a cane or walker if prescribed.
- Replace the tip on a cane as it wears down.
- Stay indoors when the weather is icy or snowy.
- Sit down when using public transportation, even if it means asking someone for his or her seat.
- Install and use grab bars in the shower and near the toilet.
- Place a nonskid mat or decals on the floor of the tub or shower.
- Use soap-on-a-rope or a suspended container of liquid soap to prevent slipping on a loose soap bar.
- Use a flashlight or nightlight when it is dark.
- Make sure that pets are not underfoot.
- Mop up spills immediately
- Use long-handled tongs rather than climbing on a chair to reach high objects

Restraints

Physical restraints: Are immobilize or reduce the ability of a client to freely move his or her arms, legs, body, or head

Chemical restraints: Drugs used to manage a clients behavior or freedom of movement.

Purpose: client or staff safety

- Use of restraints is closely regulated
- Restraints may not be used for disciplinary reasons
- Last intervention used after all others exhausted

Critical Thinking Exercises

1. What rationale would you give as the reason the Joint Commission identified National Patient Safety Goals as a criterion for compliance with accreditation?
2. If someone you know is contemplating a career in nursing, but is hesitant because of a latex allergy, what information would you offer?
3. When discharging an older adult to the care of a family member, what safety measures are appropriate to include in the discharge instructions?
4. Without resorting to the use of restraints, how can you prevent falls in a client with an unsteady gait?

Oxygenation

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Name two methods for assessing the oxygenation status of clients at the bedside.

2.. List at least five signs of inadequate oxygenation.

3. Name two nursing interventions that can be used to improve ventilation and oxygenation.

4. Identify four items that may be needed when providing oxygen therapy.

5. Name four sources for supplemental oxygen.

6. List five common oxygen delivery devices.

7. Discuss two hazards related to the administration of oxygen.

8. Describe three additional therapeutic techniques that relate to oxygenation.

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Oxygenation

- Oxygen, which measures approximately 21% in the Earth's atmosphere
- Oxygen is essential for sustaining life. Each cell of the human body uses oxygen to metabolize nutrients and produce energy.
- Without oxygen, rapidly cell death occurs.

Assessing Oxygenation

The nurse can determine the quality of a client's oxygenation by :

- collecting physical assessment data
- monitoring arterial blood gases.
- using pulse oximetry.

A combination of these helps to identify signs of:

- **hypoxemia** (insufficient oxygen within arterial blood)
- **hypoxia** (inadequate oxygen at the cellular level).

Assessing Oxygenation

Physical assessment

- Monitoring the client's respiratory rate
- Observing breathing pattern and effort
- Checking chest symmetry
- Auscultating lung sounds
- Additional assessments include recording the heart rate and blood pressure, determining the client's level of consciousness, and observing the color of the skin, mucous membranes, lips, and nail beds

Arterial blood gases (ABG) measure

An arterial blood gas (ABG) assessment is a laboratory test using arterial blood to assess oxygenation, ventilation. and acid base balance.

It measures

- The pH of blood.
- The partial pressure of oxygen dissolved in plasma (PaO**2**).
- The partial pressure of carbon dioxide in plasma (PaCO**2**).
- The percentage of hemoglobin saturated with oxygen (SaO**2**)
- The level of bicarbonate (HCO) ions

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Arterial Blood Gases

TABLE 21-1 Values for Arterial Blood Gases

COMPONENT	NORMAL RANGE	ABNORMAL FINDINGS	INDICATION OF ABNORMAL FINDINGS
pH	7.35–7.45	<7.35	Acidosis
		>7.45	Alkalosis
PaO_2	80–100 mmHg	60–80 mmHg	Mild hypoxemia
		40–60 mmHg	Moderate hypoxemia
		<40 mmHg	Severe hypoxemia
		>100 mmHg	Hyperoxygenation
$PaCO_2$	35–45 mmHg	<35 mmHg	Hyperventilation
		>45 mmHg	Hypoventilation
SaO_2	95%–100%	<95%	Hypoventilation
			Anemia
HCO_3	22–26 mEq	<22 or >26 mEq	Compensation for acid–base imbalance

Assisting With an ABG

- Keep the client at rest for at least 30 minutes.
- Record the client's temperature, respiratory rate, and level of activity.
- Record the amount of oxygen the client is receiving.
- Hyperextend the wrist over a rolled towel.
- After obtaining the specimen, expel all air bubbles from it.
- Rotate the collected specimen.
- Place the specimen on ice immediately
- Apply direct manual pressure to the arterial puncture site for 5-10 minutes.
- Cover the puncture site with a pressure dressing composed of several 4 x 4 in
- Assess the puncture site periodically for bleeding .
- Report the laboratory findings to the prescribing physician as soon as they are available.

Pulse Oximetry

Pulse oximetry is a noninvasive, transcutaneous technique for periodically or continuously monitoring the oxygen saturation of blood.

A pulse oximeter is composed of

- A photodetector sensor.
- A red and infrared light emitter.
- Microprocessor. (the device is attached to a finger, toe, earlobe, or the bridge of the nose using spring-tension or adhesive.)

The sensor detects the amount of light absorbed by hemoglobin.

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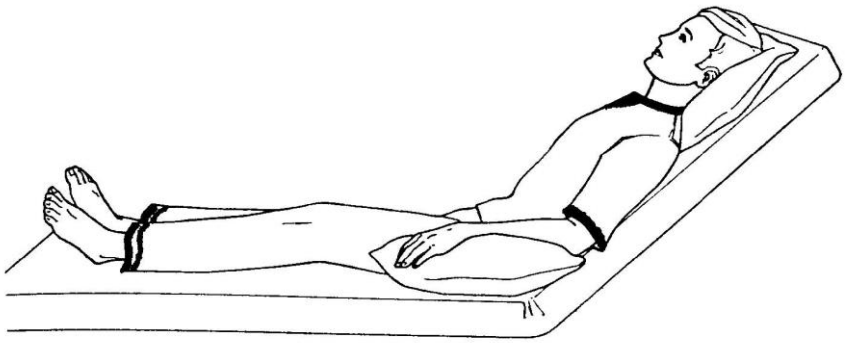
Common signs of inadequate oxygenation

- Decreased energy
- Restlessness
- Rapid, shallow breathing
- Rapid heart rate
- Sitting up to breathe
- Nasal flaring
- Use of accessory muscles
- Hypertension
- Sleepiness, confusion, stupor, coma
- Cyanosis of the skin (mucous membranes in dark-skinned clients), lips, and nail beds

Promoting Oxygenation

1-Positioning

Fowler's position (an upright seated position)



Orthopneic position: This is a seated position with the arms supported on pillows or the arm rests of a chair

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2- Breathing techniques

Deep breathing: Deep breathing is a technique for maximizing ventilation. Taking in a large volume of air fills alveoli to a greater capacity, thus improving gas exchange.

Incentive spirometry: a technique for deep breathing using a calibrated device, encourages clients to reach a goal directed volume of inspired air. Although spirometers are constructed in different ways, all are marked in at least 100 mL increments and include some visual cue, such as elevation of lightweight balls, to show how much air the client has inhaled. The calibrated measurement also helps the nurse to evaluate the effectiveness of the client's breathing. It reduces the risk of atelectasis and pulmonary consolidation.

FIGURE 21-6 During deep inhalation, a ball rises in an incentive spirometer. (Courtesy of Swedish Hospital Medical Center.)

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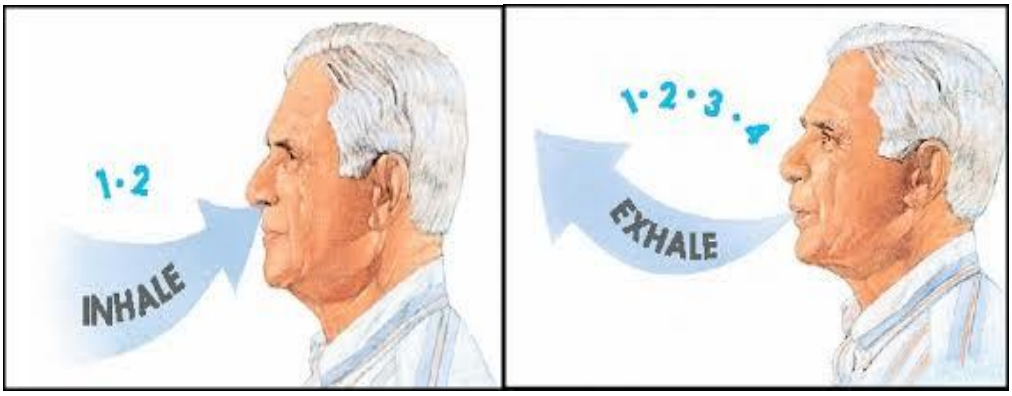
Pursed-lip breathing

is a form of controlled ventilation in which the client consciously prolongs the expiration phase of breathing. This is another technique for improving gas exchange, which, if done correctly, helps clients eliminate more than the usual amount of carbon dioxide from the lungs.



Diaphragmatic breathing:

Breathing that promotes the use of the diaphragm rather than the upper chest muscles.

The nurse teach the client and the family as follows:

- Lie down with knees slightly bent.
- Place one hand on the abdomen and the other on the chest.
- Inhale slowly and deeply through the nose while letting the abdomen rise more than the chest.
- Purse the lips.
- Contract the abdominal muscles and begin to exhale.
- Press inward and upward with the hand on the abdomen while continuing to exhale,
- Repeat the exercise for 1 full minute; rest for at least 2 minutes.
- Practice the breathing exercises at least twice a day for a period of 5-10 minutes.
- Progress to doing diaphragmatic breathing while upright and active.

Nasal strips: Adhesive nasal strips, available commercially in drug stores, are used to reduce airflow resistance by widening the breathing passage-ways of the nose.

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Oxygen Therapy

It is an intervention for administering more oxygen than is present in the atmosphere to prevent or relieve hypoxemia.

Oxygen sources

- Wall outlet
- Portable tanks
- Liquid oxygen unit
- Oxygen concentrator

Flowmeter: per minute (L/min). A flowmeter is a gauge used to regulate the amount of oxygen delivered to the client and is attached to the oxygen source

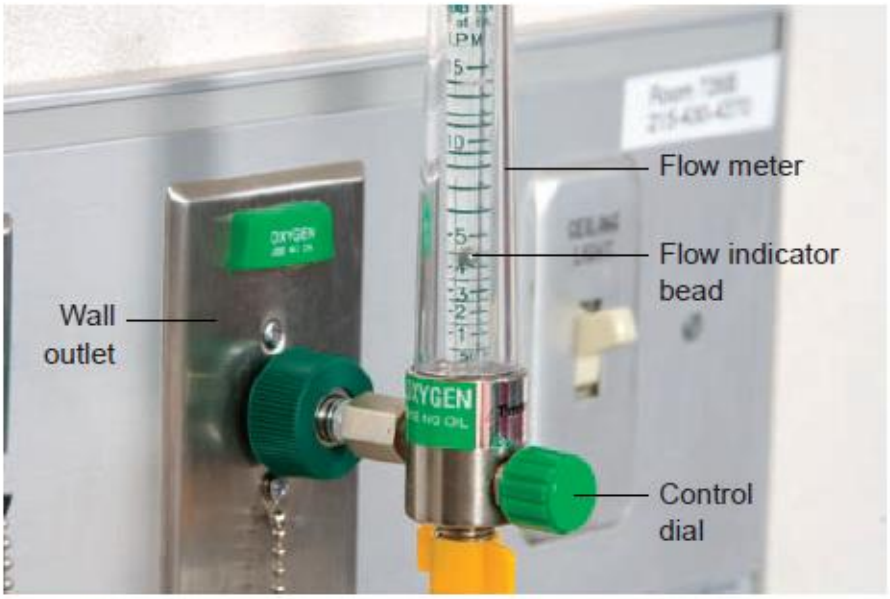

FIGURE 21-10 A flowmeter attached to a wall outlet for oxygen administration.

2. **Oxygen analyzer:** An oxygen analyzer is a device that measures the percentage of delivered oxygen to determine whether the client is receiv-ing the amount prescribed by the physician

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FIGURE 21-11 An oxygen analyzer. (Photo by B. Proud.)

3. Humidifier: A humidifier is a device that produces small water droplets and may be used during oxygen administration.

FIGURE 21-13 An oxygen humidifier attached to a flowmeter.

Nasal cannula is a hollow tube with l/2-in. Prongs placed into the client's nostrils

FIGURE 21-14 Oxygen delivered with a nasal cannula.

Oxygen Hazards

1.Fire Potential

Oxygen itself does not burn, but it does support combustion; in other words, it contributes to the burning process. Therefore, it is necessary to control all possible sources of open flames or ungrounded electricity (see Nursing Guidelines

2. Oxygen Toxicity

Oxygen toxicity means lung damage that develops when oxygen concentrations of more than 50% are administered for longer than 48 to 72 hours. The exact mechanism by which hyperoxygenation damages the lungs is not definitely known.

One theory is that it reduces **surfactant**, which is a lipoprotein produced by cells in the alveoli that promotes elasticity of the lungs and enhances gas diffusion.

Once oxygen toxicity develops, it is difficult to reverse. Unfortunately, early symptoms are quite subtle The best prevention is to administer the lowest FIO2 possible for the shortest amount of time.

Signs and symptoms of Oxygen Toxicity

- Nonproductive cough
- Substernal chest pain
- Nasal stuffiness
- Nausea and vomiting
- Fatigue
- Headache
- Sore throat
- Hypoventilation

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Related Oxygenation Techniques

Two additional techniques relate to oxygenation:

1. A water seal chest tube drainage system
2. Hyperbaric oxygen therapy (HBOT).

1. Water-Seal Chest Tube Drainage

Water-seal chest tube drainage is a technique for evacuating air or blood from the pleural cavity, which helps to restore negative intrapleural pressure and reinflate the lung.

Clients who require water-seal drainage have one or two chest tubes connected to the drainage system.

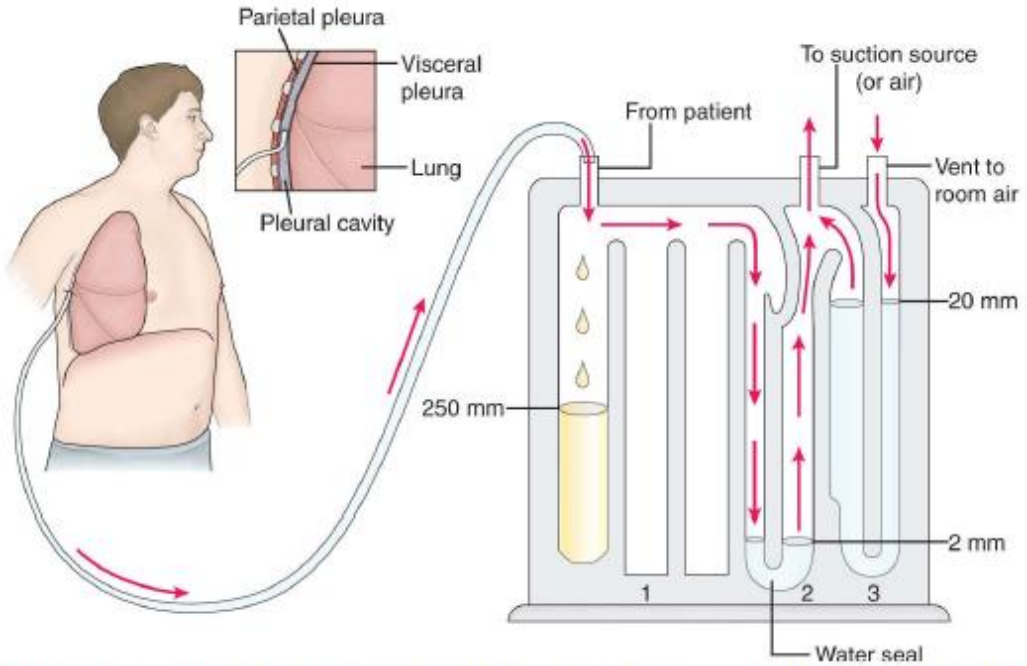

FIGURE 21-25 The three-chambered water-seal drainage system: (1) drainage collection chamber from the client, (2) the water-seal chamber, and (3) the suction control chamber attached to a source of suction and vented to room air.

2. Hyperbaric oxygen therapy (HBOT)

- HBOT consists of the delivery of 100% oxygen at three times the normal atmospheric pressure within an airtight chamber (Fig. 21-26). Treatments, which last approximately 90 minutes, are repeated over days, weeks, or months of therapy. Providing pressurized oxygen can deliver 15 times as much oxygen to tissues as can be obtained by breathing room air (Mayo Clinic, 2009). Providing clients with brief periods of breathing room air helps to prevent oxygen toxicity.
- HBOT helps to regenerate new tissue at a faster rate; thus, its most popular use is for promoting wound healing. It also is used to treat carbon monoxide poisoning, gangrene associated with diabetes or other conditions of vascular insufficiency, decompression sickness experienced by deep sea divers, anaerobic infections (especially in burn clients), and several other medical conditions.

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A hyperbaric oxygen chamber

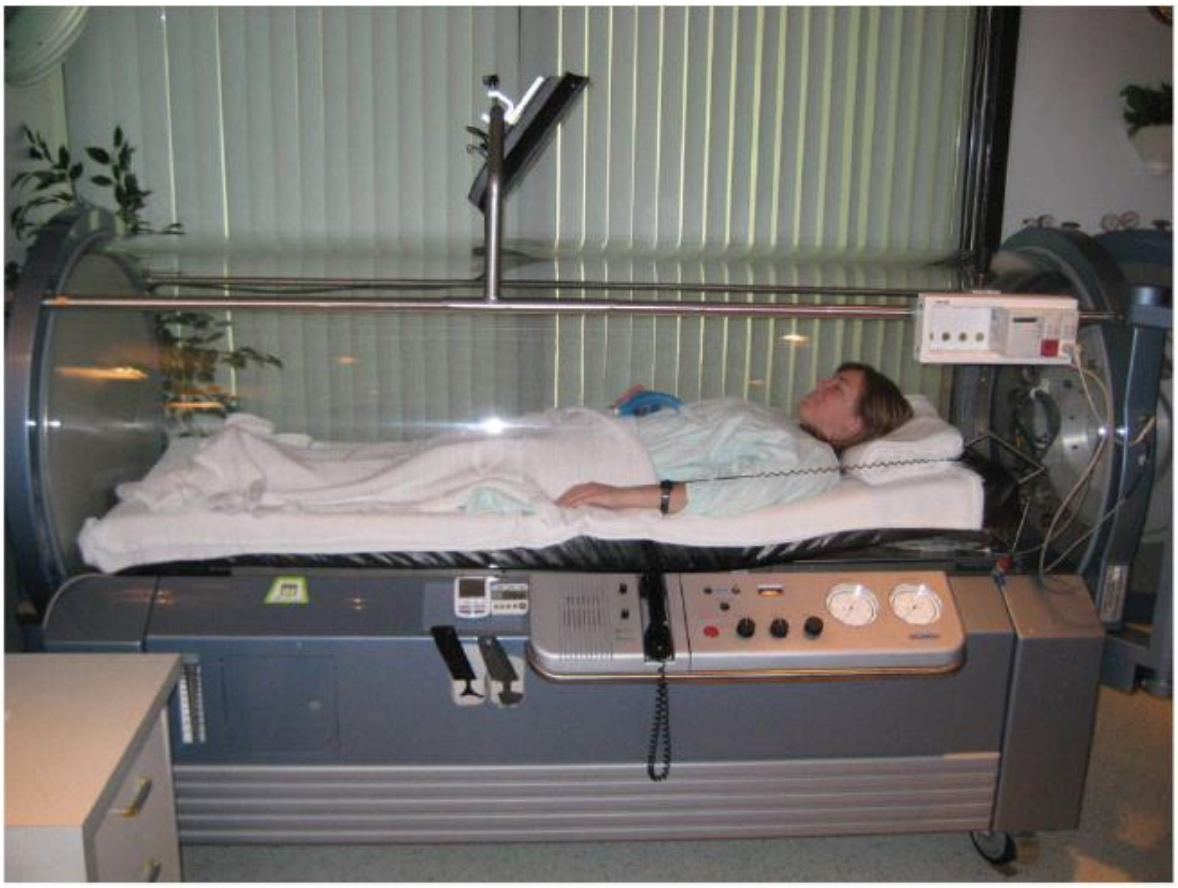

FIGURE 21-26 A hyperbaric oxygen chamber. (Photo courtesy of Moose Jaw Union Hospital, Saskatchewan, Canada.)

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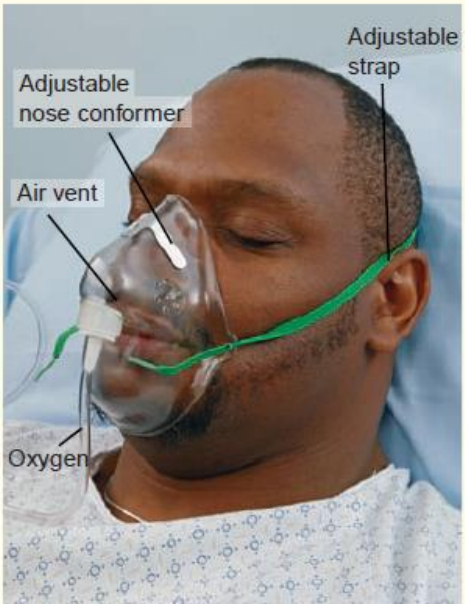
Oxygen Delivery Devices

TABLE 21-4 Comparison of Oxygen Delivery Devices

DEVICE	COMMON RANGE OF ADMINISTRATION	ADVANTAGES	DISADVANTAGES
Nasal cannula	2–6 L/min FIO_2 24%–40%[a]	Is easy to apply; promotes comfort Does not interfere with eating or talking Is less likely to create a feeling of suffocation	Dries nasal mucosa at higher flows May irritate the skin at cheeks and behind ears Is less effective in some patients who tend to mouth breathe Does not facilitate administering high FIO_2 to hypoxic clients

Masks			
Simple	5–8 L/min FIO_2 35%–50%[a]	Provides higher concentrations than possible with a cannula Is effective for mouth breathers or clients with nasal disorders	Requires humidification Interferes with eating and talking Can cause anxiety among those who are claustrophobic Creates a risk for rebreathing CO_2 retained within mask



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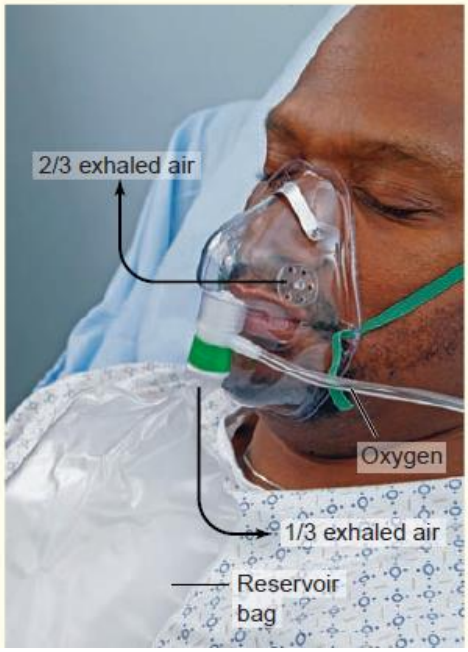
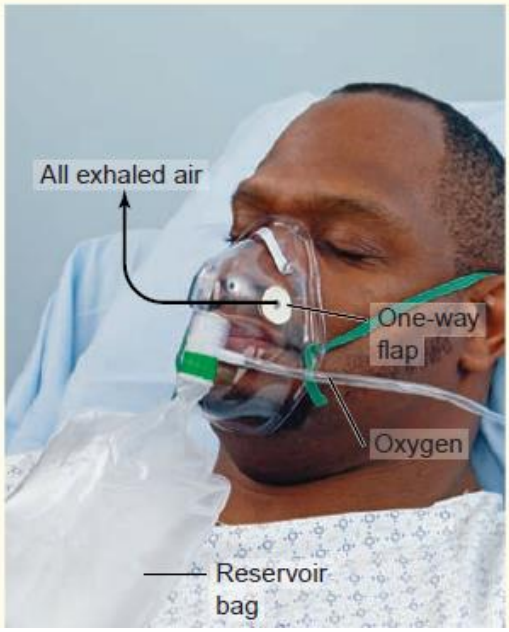
DEVICE	COMMON RANGE OF ADMINISTRATION	ADVANTAGES	DISADVANTAGES
Partial rebreather	6–10 L/min FIO_2 35%–60%[a]	Increases the amount of oxygen with lower liter flows	Requires a minimum of 6 L/min Creates a risk for suffocation Requires monitoring to verify that reservoir bag remains inflated at all times



Nonrebreather	6–10 L/min FIO_2 60%–90%[a]	Delivers highest FIO_2 possible with a mask	See partial rebreather mask Creates a risk for oxygen toxicity



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DEVICE	COMMON RANGE OF ADMINISTRATION	ADVANTAGES	DISADVANTAGES
Venturi	4–8 L/min FIO_2 24%–40%[a]	Delivers FIO_2 precisely	Permits condensation to form in tubing, which diminishes the flow of oxygen

Face tent	8–12 L/min FIO_2 30%–55%[a]	Provides a comfortable fit Is useful for clients with facial trauma and burns Facilitates humidification	Interferes with eating May result in inconsistent FIO_2, depending on environmental loss

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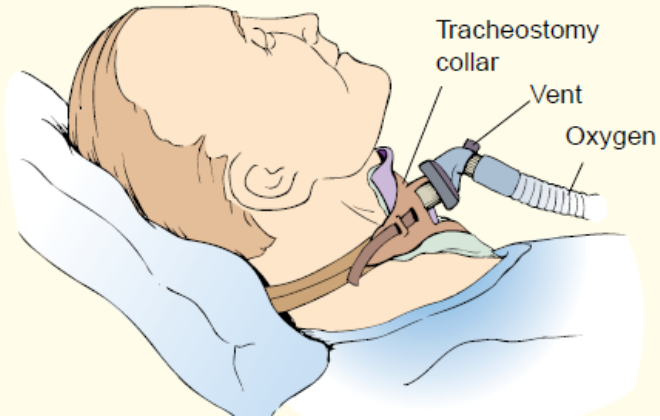
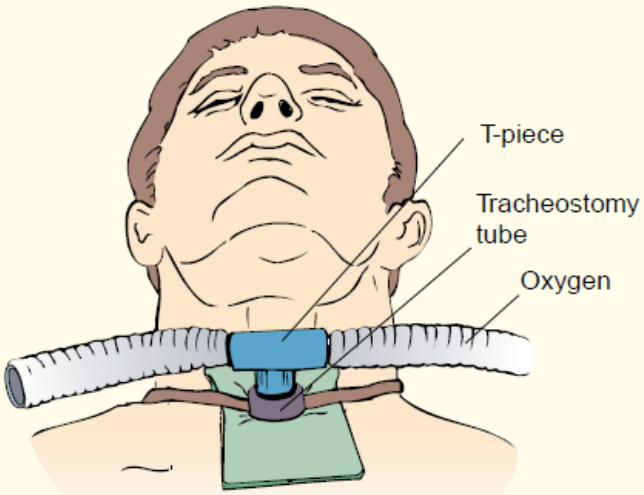
DEVICE	COMMON RANGE OF ADMINISTRATION	ADVANTAGES	DISADVANTAGES
Tracheostomy collar	4–10 L/min FIO_2 24%–100%[a]	Facilitates humidifying and warming oxygen	Allows water vapor to collect in tubing, which may drain into airway



T-piece	4–10 L/min FIO_2 24%–100%[a]	Delivers any desired FIO_2 with high humidity	May pull on tracheostomy tube Allows humidity to collect and moisten gauze dressing



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Critical Thinking Exercises

1. What levels of oxygen saturation and pulse rates are a cause for nursing concern and indicate a need for further assessment?

2. Discuss some differences between oxygen therapy in a health care setting and that in a home environment.

3. What health teaching would you provide to reduce potential problems with oxygenation?

4. What nursing actions may be appropriate if the alarm on a pulse oximeter sounds frequently because the sensor does not stay on a client's finger?

Nclex-Style Review Questions

1. When a nurse assesses a client returning from surgery, which sign is an early indication that the client's oxygenation status is compromised?

1. The client's dressing is bloody.

2. The client becomes restless.

3. The client's heart rate is irregular.

4. The client reports being thirsty.

Test-Taking Strategy: Note the key words, "early indication." Select a sign that correlates with hypoxemia.

2. When the nurse uses a pulse oximeter, what range in the SpO2 measurement indicates that the client is adequately oxygenated?

1. 80 to 100 mmHg

2. 95 to 100 mmHg

3. 80% to 100%

4. 95% to 100%

Test-Taking Strategy: Use the process of elimination to select the measurement and range for normal SpO2.

3. When administering oxygen with a partial rebreather mask, which of the following observations is most important for the nurse to report to the respiratory therapy department?

1. Moisture accumulates inside the mask.

2. The reservoir bag collapses during inspiration.

3. The mask covers the mouth and nose.

4. The strap around the head is snug.

Test-Taking Strategy: Note the key word and modifier, "most important." Select the option that requires immediate action more so than any of the others.

4. When the physician orders oxygen by nasal cannula at 5 L/min for a client with chronic pulmonary disease, what is the most appropriate nursing action to take initially?

1. Add an oxygen humidifier to the flowmeter.
2. Apply a pulse oximeter sensor to a finger.
3. Question the prescribed oxygen flow rate.
4. Substitute a mask for the nasal cannula.

Test-Taking Strategy: Note the key words and modifier, “most appropriate” and “initially.” Analyze the options and select the one that promotes the safety of the client.

5. When the nurse assesses a client with a chest tube connected to a water-seal drainage system, what are indications that the nurse should take corrective action? Select all that apply.

1. Fluid in the water-seal chamber rises and falls with respirations.
2. The fluid in the water seal is at the 2 cm mark.
3. There is dark red blood in the drainage compartment.
4. Fluid vigorously bubbles in the suction chamber.
5. There is 10 cm of water in the suction chamber.

Test-Taking Strategy: Use the process of elimination to select options that do not correlate with the safe use of water-seal drainage system.

Body Mechanics, Positioning and Moving

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Identify characteristics of good posture in a standing, sitting, or lying position.
2. Describe three principles of correct body mechanics.
3. Describe at least 10 signs or symptoms associated with the disuse syndrome.
4.. Describe six common client positions.
5. Explain the purpose of five different positioning devices used for safety and comfort.

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Body Mechanics, Positioning and Moving

- Inactivity leads to deterioration of health. Multiple complications can occur among people with limited activity and movement.
- The consequences of inactivity are collectively referred to as disuse syndrome (signs and symptoms that result from inactivity). Nursing care activities such as positioning and moving clients reduce the potential for disuse syndrome. Nurses can become injured, however, if they fail to use good posture and body mechanics while performing these activities (Table 23-1).

TABLE 23-1 Dangers of Inactivity

SYSTEMS	EFFECTS
Muscular	Weakness
	Decreased tone/strength
	Decreased size (atrophy)
Skeletal	Poor posture
	Contractures
	Foot drop
Cardiovascular	Impaired circulation
	Thrombus (clot) formation
	Dependent edema
Respiratory	Pooling of secretions
	Shallow respirations
	Atelectasis (collapsed alveoli)
Urinary	Oliguria (scanty urine)
	Urinary tract infections
	Calculi (stone) formation
	Incontinence (inability to control elimination)
Gastrointestinal	Anorexia (loss of appetite)
	Constipation
	Fecal impaction
Integumentary	Pressure sores
Endocrine	Decreased metabolic rate
	Decreased hormonal secretions
Central nervous	Sleep pattern disturbances
	Psychosocial changes

This chapter describes how to position and move clients to prevent complications associated with inactivity. It also discusses methods for protecting nurses from work-related injuries. Basic terms are defined in Table 23-2.

TABLE 23-2 Basic Terminology

TERM	DEFINITION AND EXAMPLE
Gravity	Force that pulls objects toward the center of the earth. The pull of gravity causes objects, such as an item dropped from the hand, to fall to the ground. It causes water to drain to its lowest level.
Energy	Capacity to do work. Energy is used to move the body from place to place. Energy is required to overcome the force of gravity.
Balance	Steady position with weight. A person falls when off balance.
Center of gravity	Point at which the mass of an object is centered. The center of gravity for a standing position is the center of the pelvis and about halfway between the umbilicus and the pubic bone.
Line of gravity	Imaginary vertical line that passes through the center of gravity. The line of gravity in a standing person is a straight line from the head to the feet through the center of the body.
Base of support	Area on which an object rests. The feet are the base of support when a person is in a standing position.
Alignment	Parts of an object being in proper relationship to one another. The body is in good alignment in a position of good posture.
Neutral position	The position of a limb that is turned neither toward nor away from the body's midline.
Anatomic position	Frontal and back views with arms at the sides and palms forward.
Functional position	Position in which an activity is performed properly and normally. In the hand, the wrists are slightly dorsiflexed between 20 and 35 degrees and the proximal finger joints are flexed between 45 and 60 degrees, with the thumb in opposition and in alignment with the pads of the fingers.

Maintaining Good Posture

Posture (position of the body, or the way in which it is held) affects a person's appearance, stamina, and ability to use the musculoskeletal system efficiently. Good posture, whether in a standing, sitting, or lying position, distributes gravity through the center of the body over a wide base of support and is important for both clients and nurses (Fig. 23-1).

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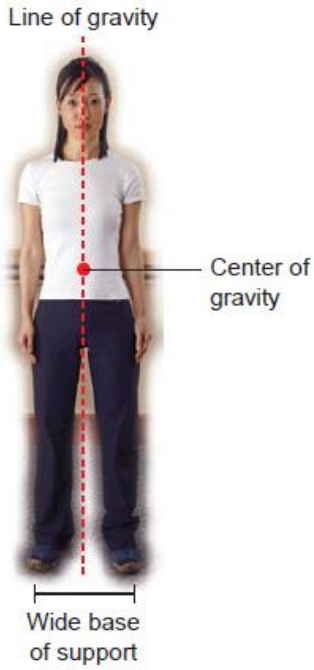

FIGURE 23-1 Good posture helps to align gravity through the center of the body. A wide stance provides a stable base for support.

When a person performs work while using poor posture, muscle spasms (sudden, forceful, involuntary muscle contractions) often result. They occur more often when muscles are strained and forced to work beyond their capacity.

Standing

- To maintain good posture in a standing position
  - Keep the feet parallel
  - Distribute weight equally on both feet
  - Bend the knees slightly
  - Maintain the hips at an even level.
  - Pull in the buttocks and hold the abdomen up
  - Hold the chest up and slightly forward
  - Keep the shoulders even and centered above the hips.
  - Hold the head erect with the face forward

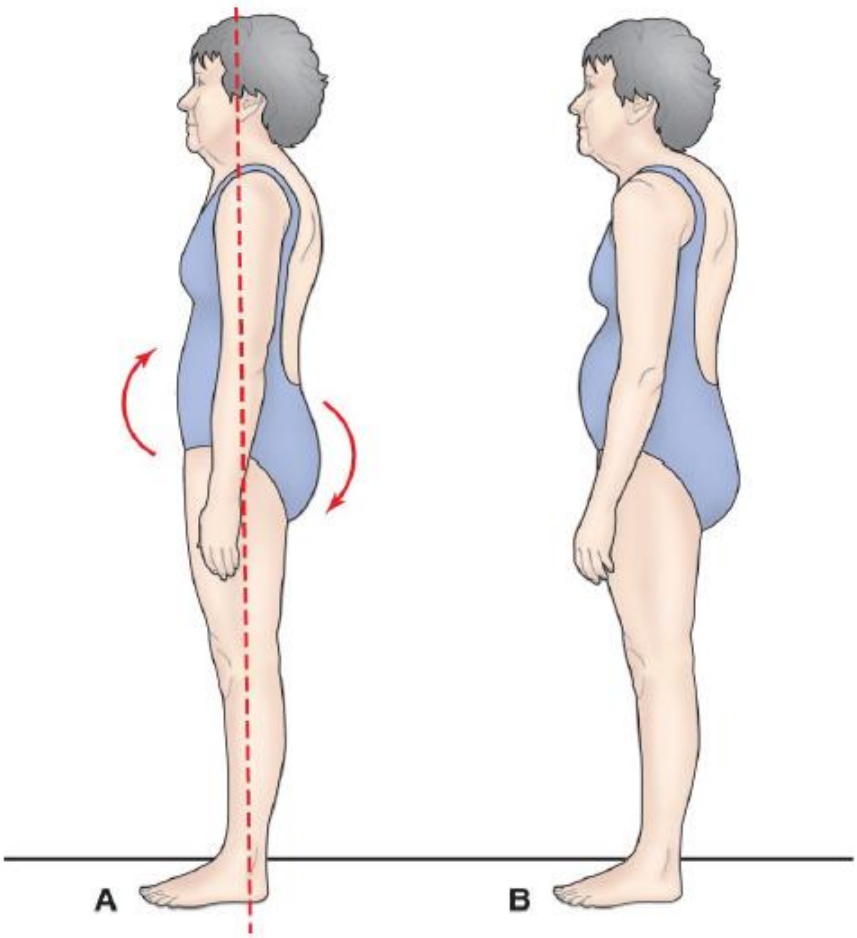

FIGURE 23-2 (A) A good standing posture results when abdominal and gluteal muscles are contracted. (B) A poor standing posture results when abdominal muscles are relaxed, causing altered body alignment.

Sitting

In a good sitting position (Fig. 23-3), the buttocks and upper thighs become the base of support. Both feet rest on the floor.

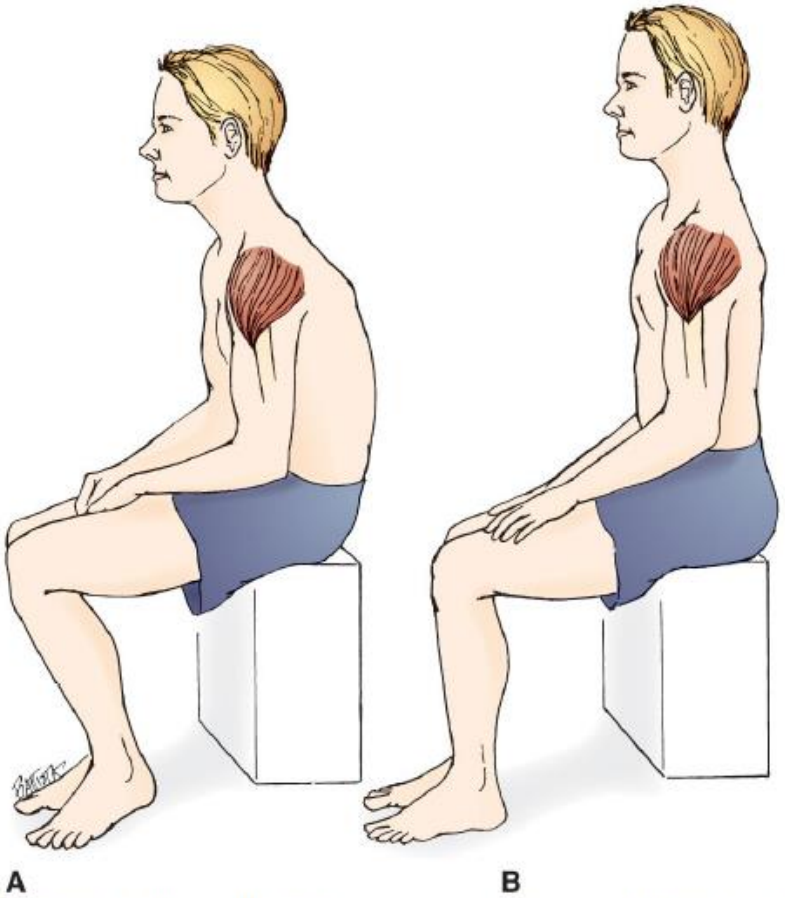

FIGURE 23-3 (A) A correct sitting posture. (B) An incorrect sitting posture. (From Hendrickson, T. [2010]. *Massage and manual therapy for orthopedic conditions* [2nd ed.]. Philadelphia, PA: Wolters Kluwer Health and Pharma.)

Lying Down

Good posture in a lying position looks the same as in a standing position, except the person is horizontal (Fig. 23-4).

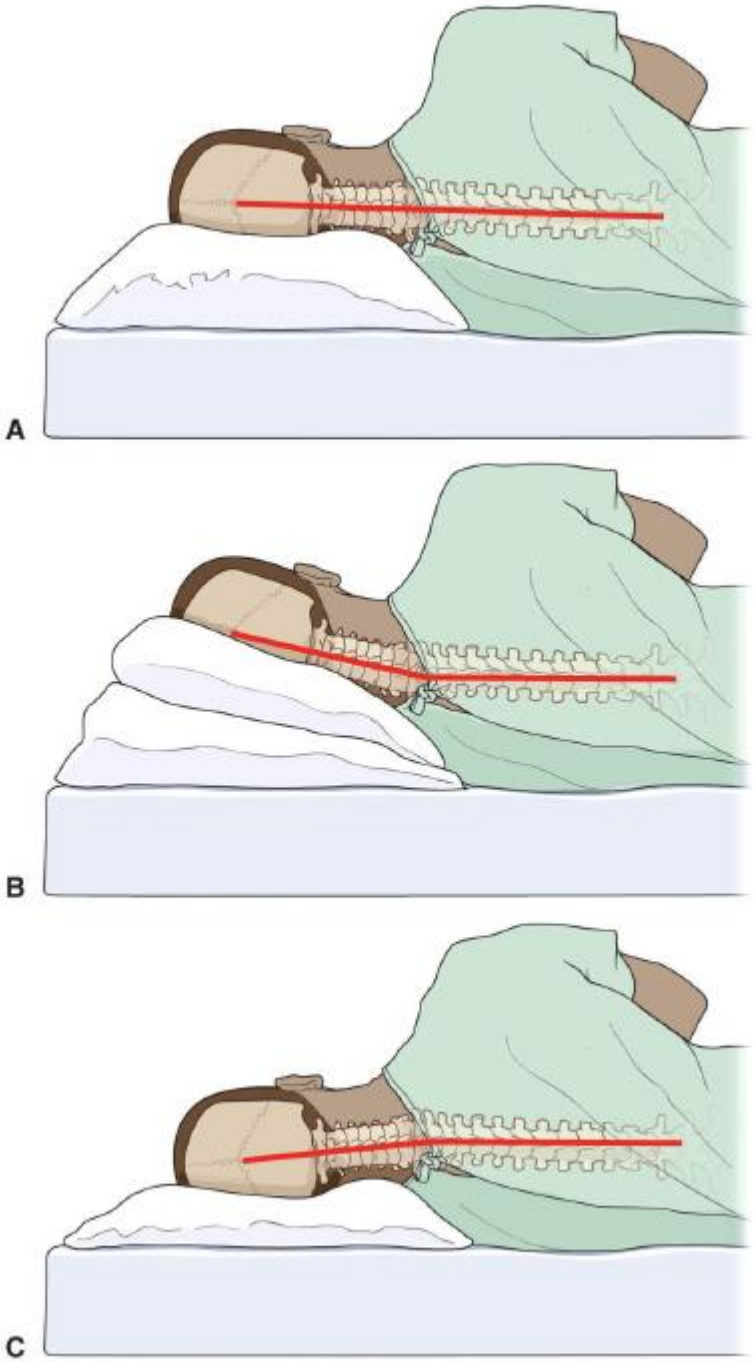

FIGURE 23-4 (A) **Maintaining the spine in neutral position (top) facilitates the best lying posture.** (B) **Positions that create neck flexion (middle) or** (C) **hyperextension (bottom) are undesirable.**

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Body Mechanics

The use of proper body mechanics (efficient use of the musculoskeletal system) increases muscle effectiveness, reduces fatigue, and helps to avoid repetitive strain injuries.

NURSING GUIDELINES 23-1

Using Good Body Mechanics

- Use the longest and strongest muscles of the arms and legs. Use of these muscles provides the greatest strength and potential for performing work.
- When lifting a heavy load, center it over the feet. Such positioning creates a base of support.
- Hold objects close to the body. Doing so increases balance.
- Bend the knees. Bending the knees prepares the spine to accept the weight of the load.
- Contract the abdominal muscles and make a long midriff. Doing so protects the muscles of the abdomen and pelvis and prevents strain and injury to the abdominal wall.
- Push, pull, or roll objects whenever possible rather than lifting them. Lifting requires more effort.
- Use body weight as a lever to assist with pushing or pulling an object. This reduces muscle strain.
- Keep feet apart for a broad base of support. This stance lowers the center of gravity, which promotes stability.
- Bend the knees and keep the back straight when lifting an object, rather than bending over from the waist with straight knees. This stance makes best use of the longest and strongest body muscles and improves balance by keeping the weight of the object close to the center of gravity.
- Avoid twisting and stretching muscles during work. Twisting can strain muscles because the line of gravity is outside the body's base of support.
- Rest between periods of exertion. Resting promotes work endurance.

Positioning Clients

Good posture and body mechanics and assistive devices are necessary when inactive clients require positioning and moving. An inactive client's position is changed to relieve pressure on bony areas of the body, promote functional mobility (alignment that maintains the potential for movement and ambulation), and provide for therapeutic needs. General principles for positioning are as follows:

- Change the inactive client's position at least every 2 hours.
- Enlist the assistance of at least one other caregiver.
- Raise the bed to the height of the caregiver's elbow.
- Remove pillows and positioning devices.
- Unfasten drainage tubes from the bed linen.
- Turn the client as a complete unit to avoid twisting the spine.
- Place the client in good alignment with joints slightly flexed.
- Replace pillows and positioning devices.
- Support limbs in a functional position

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- Use elevation to relieve swelling or promote comfort.
- Provide skin care after repositioning.

Common Positions

Nurses commonly use six body positions when caring for bedridden clients: supine, lateral, lateral oblique, prone, Sims', and Fowler's.

Supine Position

In the supine position, the person lies on the back (Fig. 23-6A). There are two primary concerns associated with the supine position: prolonged pressure, especially at the end of the spine, leads to skin breakdown; and gravity, combined with pressure on the toes from bed linen, creates a potential for foot drop (permanent dysfunctional position caused by shortening of the calf muscles and lengthening of the opposing muscles on the anterior leg; Fig. 23-7).

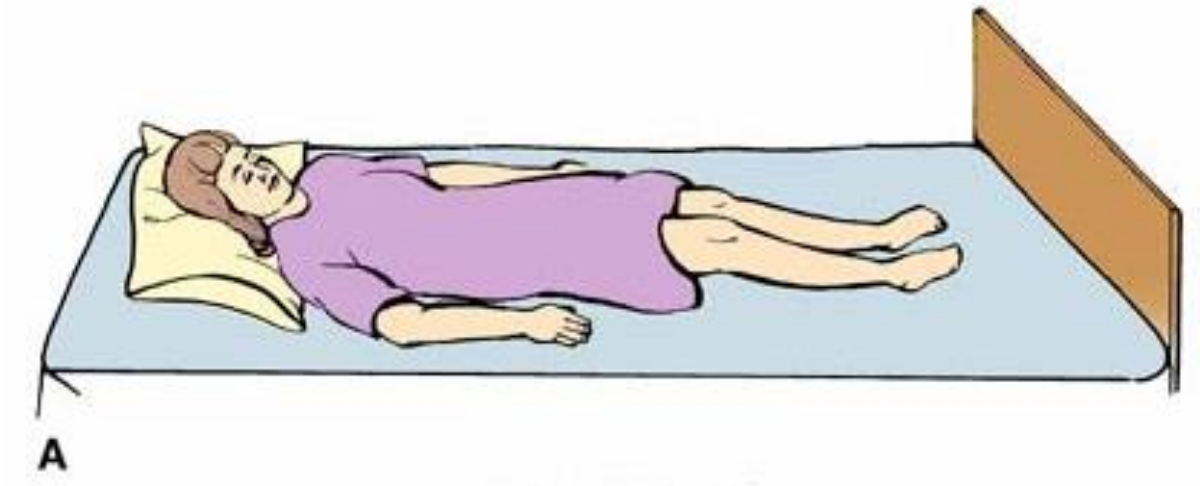

Figure 23-6: A) Supine position

Lateral Position

With the lateral position (side-lying position; see Fig. 23-6B), foot drop is of less concern because gravity does not pull down the feet as happens when clients are supine. Nevertheless, unless the upper shoulder and arm are supported, they may rotate forward and interfere with breathing.

B:) Lateral position

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Prone Position

The prone position (one in which the client lies on the abdomen; see Fig. 23-6D) is an alternative position for the person with skin breakdown from pressure ulcers. The prone position also provides good drainage from bronchioles, stretches the trunk and extremities, and keeps the hips in an extended position. The prone position improves arterial oxygenation in critically ill clients with adult respiratory distress syndrome and others who are mechanically ventilated . The prone position poses a nursing challenge for assessing and communicating with clients, however, and it is uncomfortable for clients with recent abdominal surgery or back pain.

D) Prone position.

Sims' Position

In Sims' position (semi-prone position), the client lies on the left side with the right knee drawn up toward the chest (see Fig. 23-6E). The left arm is positioned along the client's back, and the chest and abdomen are allowed to lean forward. Sims' position also is used for examination of and procedures involving the rectum and vagina.

E) Sims' position

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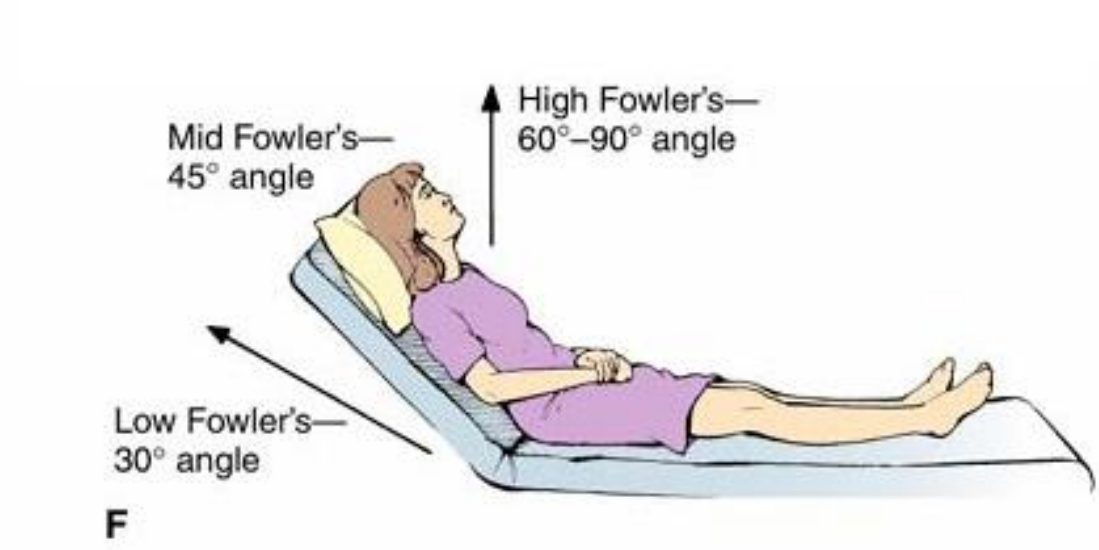
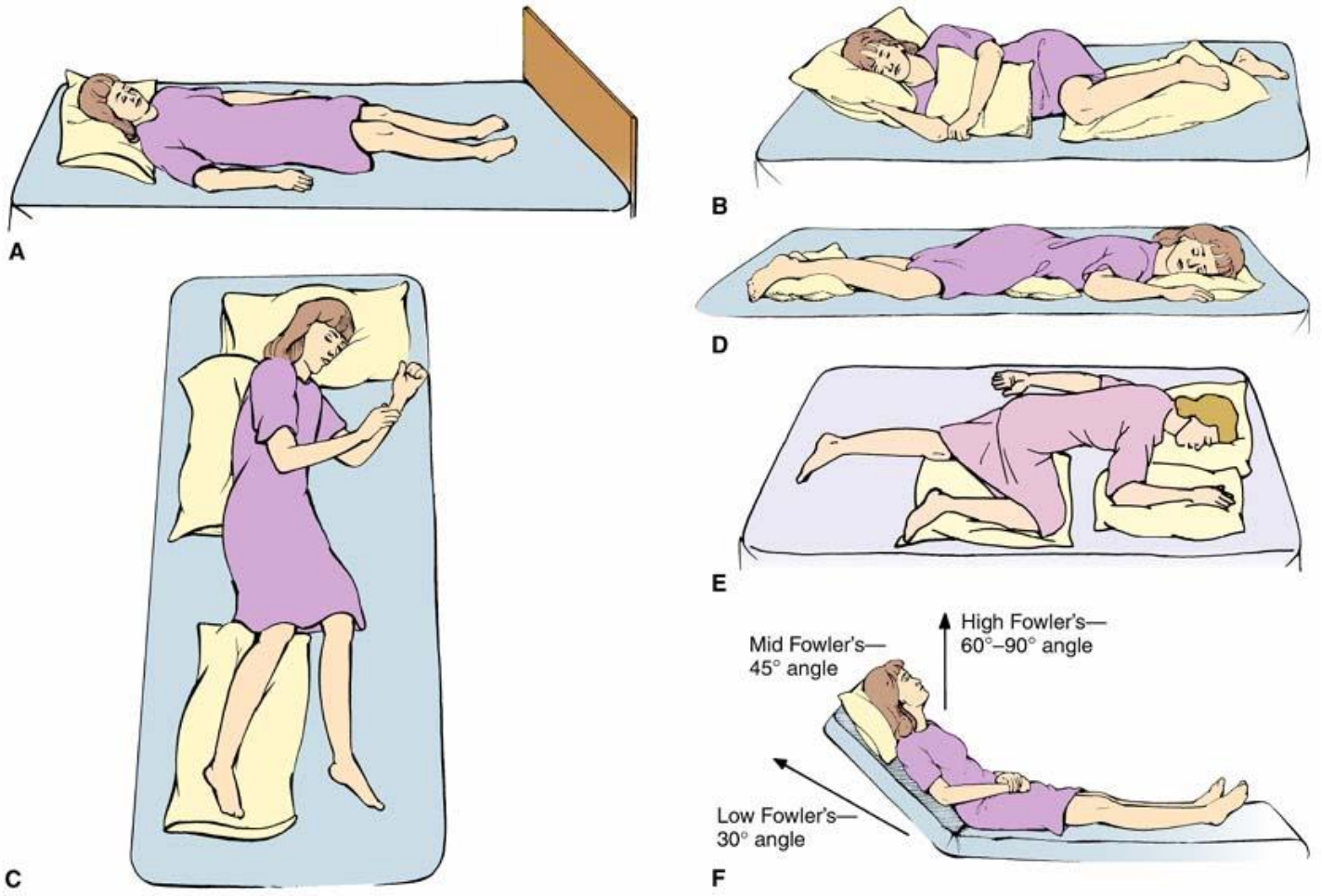
Fowler's Position

Fowler's position (semi-sitting position) makes it easier for the client to eat, talk, and look around. Three variations are common (see Fig. 23-6F).



In a *low Fowler's position*, head is elevated to 30 degrees. A *mid-Fowler's or semi-Fowler's* position refers to an elevation of up to 45 degrees. A *high Fowler's position* is an elevation of 60 to 90 degrees. The knees may not be elevated, but doing so relieves strain on the lower spine.

Fowler's position is especially helpful for clients with dyspnea because it causes the abdominal organs to drop away from the diaphragm. Relieving pressure on the diaphragm allows the exchange of a greater volume of air. Sitting for a prolonged period, however, decreases blood flow to tissues in the coccyx area and increases the risk for pressure ulcers in that area.



Positioning Devices

Adjustable Bed

The adjustable bed can be raised or lowered and allows the position of the head and knees to be changed.

Mattress

A comfortable, supportive mattress is firm but flexible enough to permit good body alignment.

Bed Board

A bed board (rigid structure placed under a mattress) provides additional skeletal support

Pillows

Pillows are used to support and elevate a body part.

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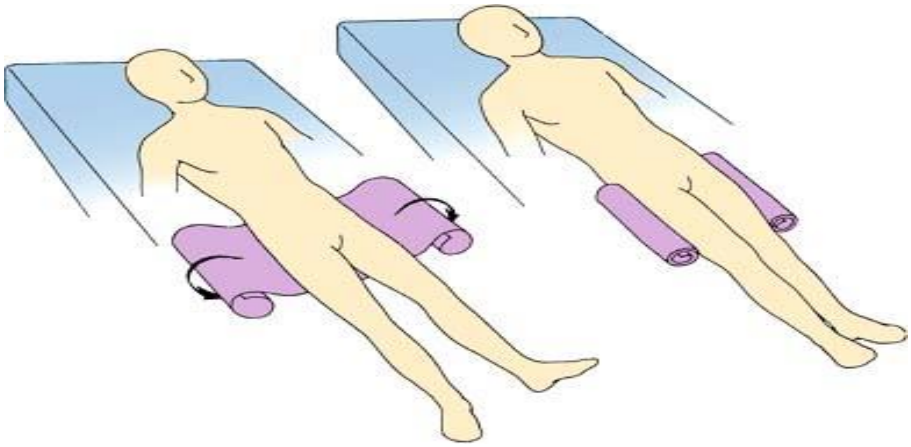
Turning and Moving Clients

Assistive devices and additional caregivers are needed when turning or moving a client who cannot change from one position to another independently or who needs help doing so.

FIGURE 23-16 A roller sheet is used for turning, moving, and repositioning.

Trochanter Rolls

Trochanter rolls (Fig. 23-10) prevent the legs from turning outward.



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Hand Rolls

Hand rolls (Fig. 23-12) are devices that preserve the client's functional ability to grasp and pick up objects. Hand rolls prevent contractures (permanently shortened muscles that resist stretching) of the fingers.

FIGURE 23-12 A hand roll. (Photo by B. Proud.)

Foot Boards, Boots, and Foot Splints

Foot boards, boots, and splints are devices that prevent foot drop by keeping the feet in a functional position (Fig. 23-13).

FIGURE 23-13 Protective boots to avoid foot drop. (Photo by B. Proud.)

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Trapeze

A trapeze is a triangular piece of metal hung by a chain over the head of the bed (Fig. 23-13).

FIGURE 23-21 Using a trapeze to facilitate movement. (From Taylor, C., Lillis, C., & Lynn, P. [2015]. *Fundamentals of nursing* [8th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins.)

Protective Devices

Side Rails

Side rails (Fig. 23-22) are a valuable device to aid clients in changing their position and moving about while in bed. With side rails in place, the client can safely turn from side to side and sit up in bed.

FIGURE 23-22 Using side rails to prepare for ambulation and to change position.

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Mattress Overlays

Mattress overlays are accessory items made of foam or containing gel, air, or water that nurses place over a standard hospital mattress.

Static Air Mattress

A static air pressure mattress is filled with a fixed volume of air

Alternating Air Mattress

An alternating air mattress (Fig. 23-15) is similar to a static one with one exception: every other channel inflates as the next one deflates.

FIGURE 23-16 An alternating air mattress. (First Step Plus; Courtesy of KCI Therapeutic Services, San Antonio, TX.)

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Water Mattress

A water mattress supports the body and equalizes the pressure per square inch over its surface.

Transferring Clients

Transfer (moving a client from place to place) refers to moving a client from bed to a chair, toilet, or stretcher and back to bed again. The client assists in an active transfer.

Nursing Implications

Impaired Physical Mobility

Risk for Injury

Risk for Disuse Syndrome

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Special Examinations and Tests

L e a r n i n g O b j e c t i v e s

On completion of this chapter, the students should be able to:

1. Differentiate between an examination and a test.
2. List 10 general nursing responsibilities related to assisting with special examinations and tests.
3. Name five positions commonly used during tests or examinations.
4. List six commonly performed categories of tests or examinations.
5. Identify four-word endings and their meanings that provide clues as to how tests or examinations are performed.
6. Discuss at least three factors to consider when performing examinations and tests on older adults.
7. Explain the following procedures: sigmoidoscopy, paracentesis, lumbar puncture, throat culture, and measurement of capillary blood glucose.

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Special Examinations and Tests

- A **diagnostic examination** is a procedure that involves physical inspection of body structures and evidence of their functions.
- It is facilitated by the use of technical equipment and techniques, such as the following:
  - Radiography (x-rays)
  - Endoscopy (optical scopes)
  - Radionuclide imaging (radioactive chemicals)
  - Ultrasonography (high-frequency sound waves)
  - Electrical graphic recordings
- A **laboratory test** is a procedure that involves the examination of body fluids or specimens

TABLE 14-1 Deciphering Diagnostic Terms

SUFFIX	MEANING	EXAMPLES	DESCRIPTION
-graphy	To record	Angiography	Test that records an image of blood vessels
-gram	An image	Angiogram	The actual image recorded during angiography
-scopy	To see	Sigmoidoscopy	Test in which the lower intestine is inspected
-scope	Examination instrument	Sigmoidoscope	A tube with a light and lens for looking within the lower intestine
-centesis	To puncture	Thoracentesis	Procedure in which a needle is used to puncture the thorax and withdraw fluid
-metry	To measure	Pelvimetry	Procedure in which the pelvis is measured
-meter	Instrument for obtaining measurements	Glucometer	Instrument for measuring glucose

General Nursing Responsibilities

- When clients undergo diagnostic examinations and laboratory tests, nurses have specific responsibilities before, during, and after the procedures.

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Preprocedural Care

- Before a client agrees to a procedure, the nurse determines whether the *client understands* its purpose and the activities involved. Once he or she obtains the *client's consent, the nurse prepares* the client, obtains equipment and supplies, and readies the examination area.

1. Clarifying Explanations
    - a signed consent form
    - giving clients sufficient information

2. Preparing Clients
    - such as withholding food and fluids or modifying the diet… the nurse refers to written protocols
    - the nurse must understand the client's responsibilities and instruct him or her accordingly.
    - Regardless of the type of examination or test, the nurse helps the client to *change into an examination gown, applies an identification bracelet, takes vital signs, and suggests that the client empty the bladder*. The nurse *continues to monitor* the condition of waiting clients who can experience adverse effects from fatigue, delayed food consumption, or medical symptoms.

3. Obtaining Equipment and Supplies:
    - If an examina-tion or test is performed at the bedside or in an examination room or the nursing unit, the nurse obtains equipment and supplies ahead of time.
    - Some items that nurses may need are in packaged kits (such as a lumbar puncture kit).
    - If using a packaged kit, the nurse checks the list of contents to determine what, if any, additional items are needed. Clean gloves, goggles, masks, and gowns are required to prevent direct contact with blood or body secretions.
4. Arranging the Examination Area
    - The nurse removes unnecessary articles from the area and provides privacy.
    - A lined receptacle is nearby for disposal of soiled items
    - The nurse arranges equipment and supplies for easy access by the examiner
    - Sterile items remain wrapped or covered until just before their use. Before the examiner arrives, nurses check instruments that require electric power, batteries, or lights so that they can replace nonfunctioning equipment.

Procedural Responsibilities

- During the examination or test, the nurse positions and drapes the client, provides the examiner with technical assistance, and supports the client physically and emotionally.

1. Positioning And Draping

- They include five positions; the dorsal recumbent position, Sims' or left lateral position, lithotomy position, knee–chest or genupectoral position, and modified standing position (Table 14-2).

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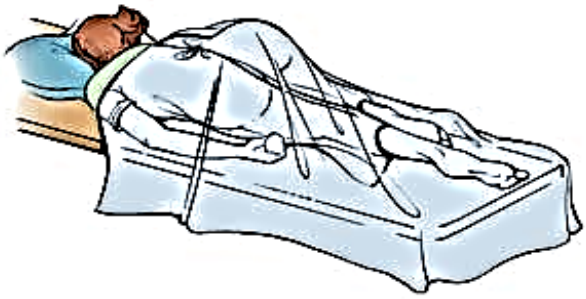
A. Dorsal recumbent position

- External genitalia inspection
- Vaginal examination
- Rectal examination
- Urinary catheter insertion

B. Lithotomy position

- Internal pelvic examination (female)
- Obstetric delivery
- Cystoscopic (bladder) examination
- Rectal examination

C. Sims' position



- Rectal examination
- Vaginal examination
- Rectal temperature assessment
- Suppository insertion
- Enema administration

D. Knee–chest position

- Rectal and lower intestinal examinations
- Prostate gland examination

E. Modified standing position

- Prostate gland examination

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2. Assisting the Examiner

3. Providing Physical and Emotional Support

- Throughout any examination or test, the nurse continuously observes the client's physical and emotional reactions and responds accordingly.
- Holding the client's hand and offering words of encouragement help the client to endure temporary discomfort.

Postprocedural Care

After the completion of examinations and tests, the nurse attends to the client's comfort and safety, cares for specimens, and records and reports pertinent data.

1. Attending to the Client

The nurse helps the client to a position of comfort. He or she rechecks vital signs to verify that the client's condition is stable. The nurse cleans any substances from the client that caused soiling. He or she offers hospitalized clients a clean gown or directs outpatients to dress in their own clothing. and provides instructions for follow-up care.

2. Caring for Specimens

Sometimes **specimens** (samples of tissue or body fluids) are collected during an examination or test. To ensure their accurate analysis, the nurse does the following:

- Collects the specimen in an appropriate container
- Labels the specimen container with correct information
- Attaches the proper laboratory request form
- Ensures that the specimen does not decompose before it can be examined
- Delivers the specimen to the laboratory as soon as possible

Common Factors That Invalidate Examination or Test Results

- Incorrect diet preparation
- Failure to remain fasting
- Insufficient bowel cleansing
- Drug interactions
- Inadequate specimen volume
- Failure to deliver specimen in a timely manner
- Incorrect or missing test requisition

3. Recording and Reporting Data

The nurse must document certain information whenever a client undergoes a special examination or test. General information includes the following:

- Date and time
- Pertinent pre-examination assessments and preparation
- Type of test or examination
- Who performed the test or examination
- Where the test or examination was performed
- Response of client during the examination and afterward
- Type of specimen obtained, if any
- Appearance, size, or volume of specimen
- Where the specimen was transported

In addition to the written account of the examination, the nurse reports significant information to other nursing team members.

Common Diagnostic Examinations

Pelvic Examination

- A **pelvic examination** is the physical inspection of the vagina and cervix with palpation of the uterus and ovaries. she often collects a specimen of cervical secretions for a **Pap (Papanicolaou) test**.
- This test, also called a Pap smear, screens for abnormal cervical cells, the status of reproductive hormone activity, and normal or infectious microorganisms within the vagina or uterus.

Radiography

- **Radiography** or **roentgenography** (general term for procedures that use roentgen rays, or x-rays) produces images of body structures. The actual film image is technically called a roentgenogram but is commonly known as an x-ray.
- Repeated exposure to x-rays, even at small doses, or a single exposure to a high dose causes cell damage that can lead to cancerous cell changes.
- X-rays are avoided during pregnancy

Magnetic resonance imaging (MRI) Is a technique for producing an image by using atoms subjected to a strong electromagnetic field. This diagnostic alternative does not involve exposure to the type of radiation produced with roentgenography (Fig. 14-3).

Metal objects on a client's person must be removed before an MRI.

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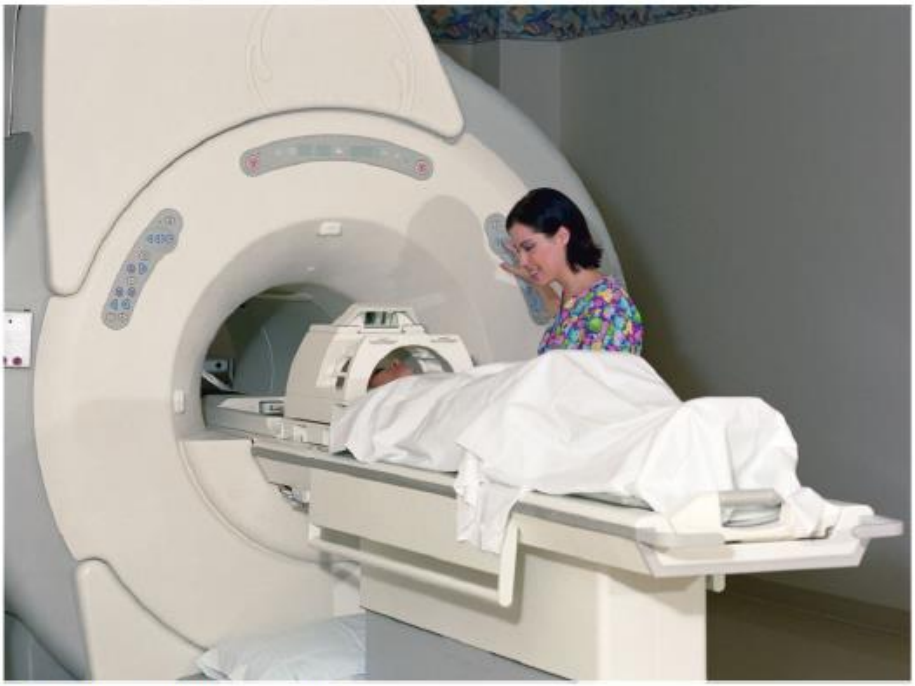

FIGURE 14-3 Magnetic resonance imaging.

TABLE 14-4 Common Radiographic Examinations

EXAMINATION	EXAMPLES OF INDICATIONS FOR USE
Chest X-ray (anterior, posterior, lateral views)	Detects pneumonia, broken ribs, lung tumors, enlarged heart
Upper gastrointestinal X-ray (upper GI or barium swallow)	Aids in diagnosis of ulcers, GI tumors, narrowing of the esophagus
Lower gastrointestinal X-ray (lower GI or barium enema)	Helps in diagnosis of polyps or tumors of the bowel, intestinal obstruction, and structural changes within the intestine
Cholecystography (X-ray of the gallbladder and ducts)	Facilitates determining the presence of gallstones and obstruction in the flow of bile
Intravenous pyelography (IVP)	Helps identify urinary malformations, tumors, stones, cysts, and obstructions in the kidneys and ureters
Retrograde pyelography	Same as for IVP, but the contrast medium is instilled through a urinary catheter
Angiography (X-ray of blood vessels)	Determines the location where and the extent to which blood vessels have narrowed, or evaluates improvement after treatment
Myelography (X-ray of spinal canal)	Detects spinal tumors, ruptured intervertebral disks, and bony changes in the vertebrae

GI, gastrointestinal.

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Contrast Medium

- A **contrast medium** is a substance that adds density to a body organ or cavity, such as barium sulfate or iodine. It makes hollow body areas appear more distinct when imaged on x-ray film. Some people are sensitive to substances used in contrast media and have an immediate allergic reaction to them.
- Contrast media are administered orally or rectally or injected intravenously.

Computed tomography (CT) scanning is a form of roentgenography that shows planes of tissue.
This and other types of X-ray examinations use contrast media.

Related Nursing Responsibilities

For the client undergoing radiographic examination, nursing responsibilities include the following:

- Assess vital signs before the examination
- Remove any metal items such as a metal. Metal produces a dense image that may be confused with a tissue abnormality.
- Request a lead apron or collar to shield a fetus or vulnerable body parts during x-rays (Fig. 14-5).

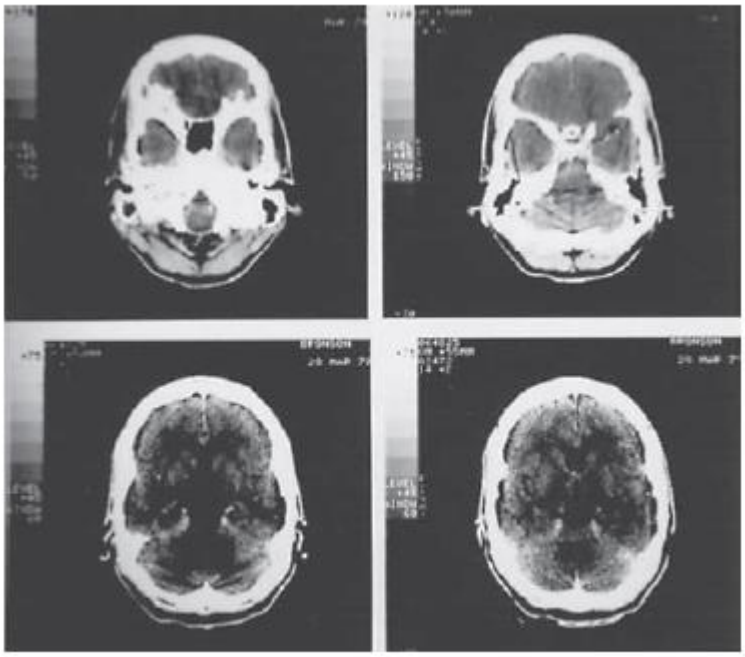

FIGURE 14-4 Cross-sections of a cranial computed tomography (CT) scan. (Photo by Ken Timby.)

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FIGURE 14-5 A lead thyroid collar, apron, and skirt. (Photo by B. Proud.)

- If the radiographic study involves administration of a contrast medium, ask the client about allergies, especially to seafood or iodine, or previous adverse reactions during a diagnostic examination.
- Know the location of emergency equipment and drugs in case there is an unexpected allergic reaction to contrast medium.
- To promote urinary excretion, encourage the client to drink a large amount of fluid after an examination involving iodine to promote its excretion.
- Check on bowel elimination and stool characteristics for at least 2 days after administration of oral barium contrast medium. Barium retention can lead to constipation and bowel obstruction. Report absence of bowel elimination beyond 2 days.

Endoscopic Examinations

Endoscopy (visual examination of internal structures) is performed using optical scopes. Endoscopes have lighted mirror-lens systems attached to a tube and are quite flexible so that they can be advanced through curved structures.

Endoscopic examinations are named primarily for the structure being examined. In addition to allowing the examiner to inspect the appearance of a structure, endoscopes also have attachments that permit various forms of treatment or the collection of specimens for microscopic analysis.

Examples of Endoscopic Examinations

Bronchoscopy—inspection of the bronchi

Gastroscopy—inspection of the stomach

Colonoscopy—inspection of the colon

Esophagogastroduodenoscopy (EGD)—inspection of the esophagus, stomach, and duodenum

Laparoscopy—inspection of the abdominal cavity

Cystoscopy—inspection of the urinary bladder

performed more frequently on an outpatient basis

Related Nursing Responsibilities

- To prevent aspiration, withhold food and fluids or advise the client to do so for at least 6 hours before any procedure in which an endoscope is inserted into the upper airway or upper gastrointestinal tract.
- If conscious sedation is used, monitor the client's vital signs, breathing, oxygen saturation and cardiac rhythm
- Topical anesthesia is used to facilitate the passage of an endoscope into the airway or upper gastrointestinal tract, withhold food or fluids for at least 2 hours after the procedure and until swallow, cough, and gag reflexes return
- Relieve the client's sore throat with ice chips, fluids, or gargles when it is safe to do so.
- Confirm that bowel preparation using laxatives and enemas has been completed before endoscopic procedures of the lower intestine.
- Report difficulty in arousing a client or any sharp pain, fever, unusual bleeding, nausea, vomiting, or difficulty with urination after any endoscopic examination.

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Radionuclide Imaging

- **Radionuclides** are elements whose molecular structures are altered to produce radiation. They are identified by a number followed by a chemical symbol, such as 131I (radioactive iodine) and 99Tc (radioactive technetium).
- Positron Emission Tomography (PET)
- The terms **hot spot** (area where the radionuclide is intensely concentrated) and **cold spot** (area with little if any radionuclide concentration) refer to the amount of radiation that the tissue absorbs.
- Tests using radionuclides, however, are contraindicated for women who are pregnant or breast-feeding: the energy released is harmful to the rapidly growing cells of an infant or fetus.

Related Nursing Responsibilities

- Inquire about a woman's menstrual and obstetric history. Notify the **nuclear medicine department** (unit responsible for radionuclide imaging) if the client is pregnant, could possibly be pregnant, or is breast-feeding.
- Ask about the allergy history because iodine commonly is used in radionuclide examinations.
- Assist the client with a gown, robe, and slippers. Make sure the client has no internal metal devices or external metal objects because these interfere with diagnostic findings.
- Obtain an accurate weight because the dose of radionuclide is calculated according to weight.
- Inform the client that he or she will be radioactive for a brief period (usually less than 24 hours) but that body fluids, such as urine, stool, and emesis, can be safely flushed away.
- Instruct premenopausal women to use effective birth control for the short period during which radiation continues to be present.

Ultrasonography

- **Ultrasonography** (soft tissue examination that uses sound waves in ranges beyond human hearing) is also known as **echography**.
- a hand-held probe called a **transducer** projects sound through the body's surface.
- The reflected sound waves are converted into a visual image called an ,ultrasonogram ,sonogram or , echogram.
- Ultrasound examinations are used to visualize breast, abdominal, and pelvic organs; male reproductive organs; structures in the head and neck; the heart and valves; and structures within the eyes.
- is used in obstetrics to determine fetal size, more than one fetus, and location of the placenta.

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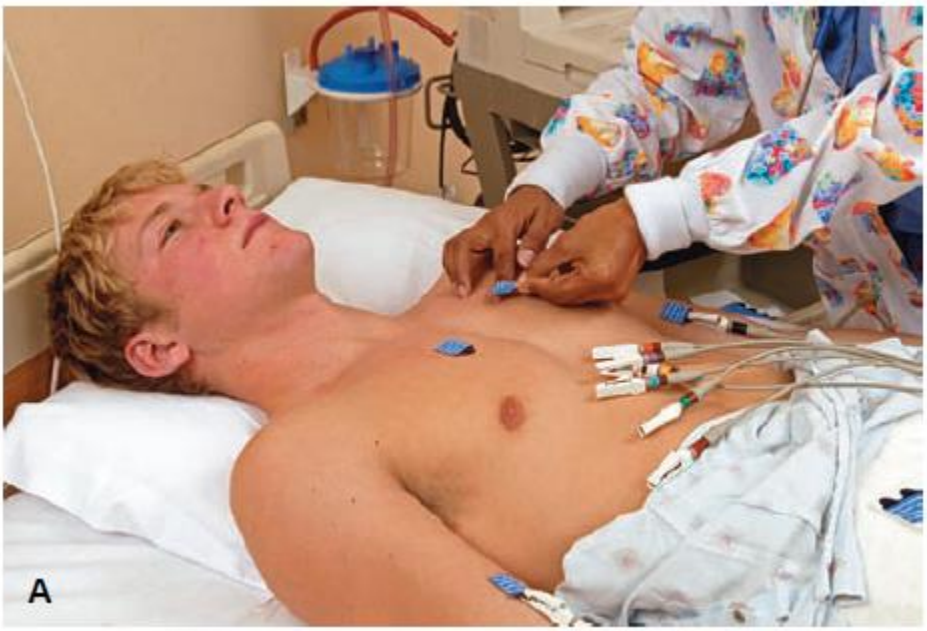
- Because ultrasound examinations do not involve radiation or contrast media, they are extremely safe diagnostic tools.

Related Nursing Responsibilities

- For best visualization, schedule abdominal and pelvic ultrasonography before any examinations that use barium.
- Instruct clients undergoing abdominal ultrasonography to drink five to six full glasses of fluid approximately 1 to 2 hours before the test. To ensure a full bladder, they should not urinate until after the test is completed.
- Explain that acoustic gel is applied over the area where the transducer is placed.

Electrical Graphic Recordings

Machines can record electrical impulses from structures such as the heart, brain, and skeletal muscles. These tests are identified by the prefix "electro-" as in **electrocardiography** (ECG or EKG; examination of the electrical activity in the heart), **electroencephalography** (EEG; examination of the energy emitted by the brain), and **electromyography** (EMG; examination of the energy produced by stimulated muscles).



- To detect electrical activity, wires called are attached to the skin (or muscle in the case of an EMG). They transmit electrical activity to a machine that converts it into a series of waveforms .
- Occasionally there is slight discomfort during an EMG.

Related Nursing Responsibilities

- For the client undergoing an ECG, nursing responsibilities include the following:
- Clean the skin and clip hair in the area where the electrode tabs will be placed to ensure adherence and reduce discomfort on removal.
- Attach the adhesive electrode tabs to the skin where the electrode wires will be fastened.
- Avoid attaching the adhesive tabs over bones, scars, or breast tissue.

For the client undergoing an EEG, nursing responsibilities include the following:

- Instruct the client to shampoo the hair the evening before the procedure to facilitate firm attachment of the electrodes. He or she should shampoo the hair after the test to remove adhesive from the scalp.
- Withhold coffee, tea, and cola beverages for 8 hours before the procedure. Consult with the physician about withholding scheduled medications, especially those that affect neurologic activity.
- If a sleep-deprived EEG is scheduled, instruct the client that he or she must stay awake after midnight before the examination.

For the client undergoing an EMG, nursing responsibilities include the following:

- Tell the client he or she will be instructed to contract and relax certain muscles during the examination.
- Explain that electrical current is applied to muscles during an EMG but that the sensation is not usually painful. Also, a muscle electrode is inserted with a small-gauge needle in 10 or more locations, but the experience is painless unless it touches a terminal nerve in the area.

Diagnostic Laboratory Tests

Nurses, laboratory personnel, and physicians collect specimens such as blood, urine, stool, sputum, intestinal secretions, spinal fluid, and drainage from wounds or infected tissue

Assisting with a Paracentesis

A **paracentesis** is a procedure for withdrawing fluid from the abdominal cavity. A physician always performs it with the assistance of a nurse. to relieve abdominal pressure and to improve breathing, which generally becomes labored when fluid crowds the lungs Sometimes paracentesis removes 1 liter or more of fluid

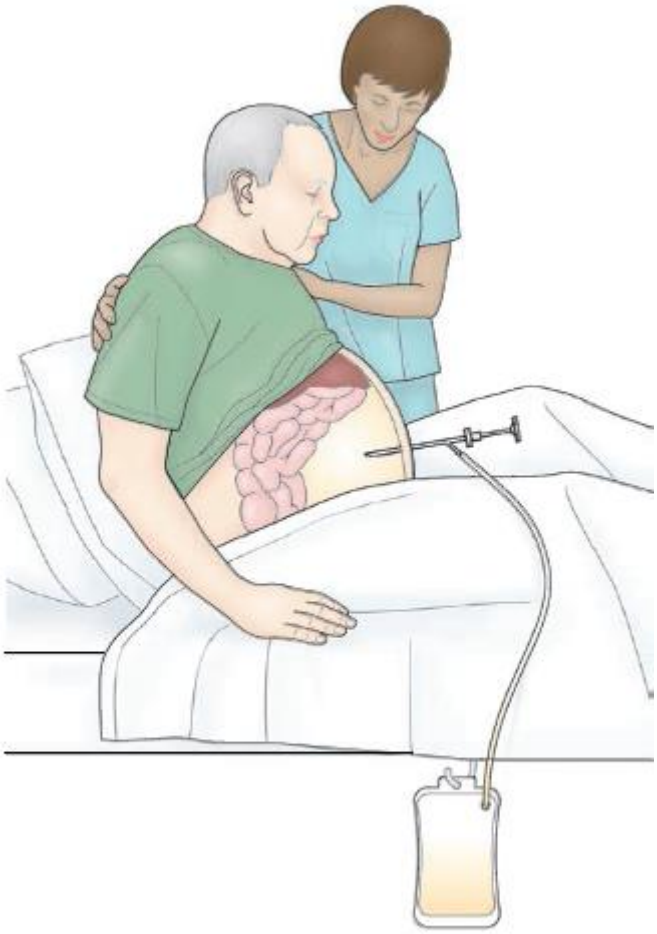


FIGURE 14-7 The nurse offers support during an abdominal paracentesis.

Assisting with a Lumbar Puncture

The physician requires nursing assistance when performing a **lumbar puncture** or **spinal tap**. This procedure involves inserting a needle between lumbar vertebrae in the spine but below the spinal cord itself. The physician advances the tip of the needle until it is beneath the middle layer of the membrane surrounding the spinal cord. He or she measures the spinal fluid pressure and then withdraws a small amount of fluid.

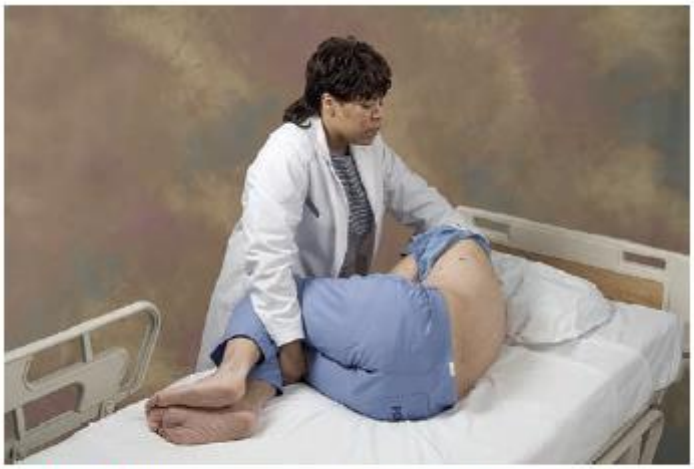


FIGURE 14-8 Positioning for lumbar puncture. (Photo by B. Proud.)

It is used to diagnose conditions that raise the pressure within the brain, such as brain or spinal cord tumors, or infections such as meningitis. Spinal fluid also is withdrawn before instilling contrast medium for x-rays of the spinal column.

Collecting a Specimen for a Throat Culture

A **culture** (incubation of microorganisms) is performed by collecting body fluid or substances suspected of containing infectious microorganisms, growing the living microorganisms in a nutritive substance, and examining their characteristics with a microscope. Cultures are performed commonly on urine, blood, stool, wound drainage, and throat secretions.

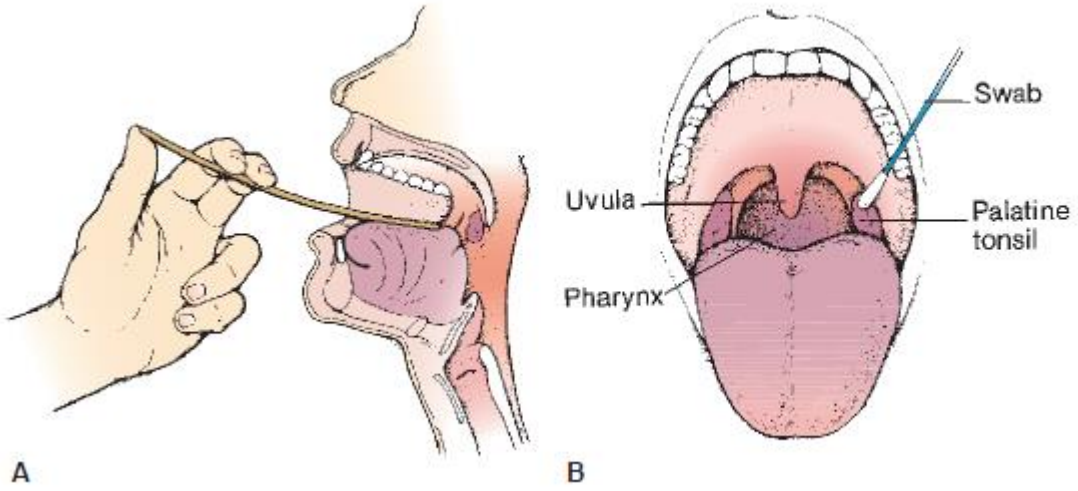


FIGURE 14-9 A throat culture.
A. Depressing the tongue.
B. Obtaining a specimen.

Nursing Guidelines

Assisting with a Paracentesis

- Explain the procedure or clarify the physician's explanation to the client. Explanations prepare the client for an unfamiliar experience or promote a clearer understanding.
- Ensure that the client has signed the consent form, if needed. A consent form provides legal protection.
- Measure and record weight, blood pressure, and respiratory rate; measure abdominal girth at its widest point with a tape measure. These data serve as a basis for postprocedural comparisons.
- Obtain a prepackaged paracentesis kit along with a vial of local anesthetic. Gathering supplies promotes efficient time management.
- Make sure that extra gloves, gown, mask, and goggles are available. These items protect against contact with microorganisms, such as HIV, that may be in blood or other body fluids.
- Encourage the client to empty the bladder just before the procedure. An empty bladder prevents accidental puncture of the bladder.
- Place the client in a sitting position. This position pools abdominal fluid in the lower areas of the abdomen and displaces the intestines posteriorly.
- Hold the container of local anesthetic so the physician can withdraw a sufficient amount. Doing so prevents contaminating the physician's sterile gloves.
- Offer the client support as an area of the abdomen is anesthetized then pierced with an instrument called a trocar and a hollow sheath called a cannula is inserted Empathetic concern helps to relieve anxiety.
- Reassess the client periodically after cannula insertion; expect that blood pressure and respiratory rate may decrease. Assessment indicates the client's response.
- Place a Band-Aid or small dressing over the puncture site after withdrawal of the cannula. *The dressing acts as a barrier to microorganisms and absorbs drainage.*
- Assist the client to a position of comfort. *Doing so demonstrates concern for the client's welfare.*

- Measure the volume of fluid withdrawn. *This measurement contributes to accurate assessment of fluid volume.*
- Label the specimen, if ordered, and send it to the laboratory with the appropriate requisition form. *Doing so facilitates appropriate analysis.*
- Document pertinent information such as the appearance and volume of the fluid, client assessments, and disposition of the specimen. *Such documentation adds essential data to the client's medical record.*

Nursing Guidelines

Assisting with a Lumbar Puncture

- Explain the procedure or clarify the physician's explanation to the client. Explanations prepare the client for an unfamiliar experience or promote a clearer understanding.
- Ensure that the client has signed the consent form, if needed. A consent form provides legal protection.
- Perform a basic neurologic examination including pupil size and response and muscle strength and sensation in all four extremities. This information provides a baseline for future comparisons.
- Encourage the client to empty the bladder. An empty bladder promotes comfort during the procedure.
- Administer a sedative drug if ordered. Sedatives reduce anxiety.
- Obtain a prepackaged lumbar puncture kit along with a vial of local anesthetic. Gathering supplies promotes efficient time management.
- Make sure that extra gloves, gown, mask, and goggles are available. These items offer protection from contact with microorganisms, such as HIV, that may be present in blood or other body fluids.
- Place the client on his or her side with the knees and neck acutely flexed or in a sitting position, bent from the hips. These positions separate the bony vertebrae.
- Instruct the client that once the needle is inserted, he or she must avoid movement. This measure prevents injury.
- Hold the container of local anesthetic so the physician can withdraw a sufficient amount. Doing so prevents contaminating the physician's sterile gloves.
- Stabilize the client's position at the neck and knees. This reinforces the need to remain motionless.
- Support the client emotionally as the needle is inserted and the skin is injected with local anesthesia. Empathetic concern helps to relieve anxiety.
- Tell the client that it is not unusual to feel pressure or a shooting pain down the leg. This information prepares the client for expected sensations.
- Perform Queckenstedt's test, if asked, by compressing each jugular vein separately for approximately 10 seconds while pressure is being measured. Queckenstedt's test helps demonstrate if there is an obstruction in the circulation of spinal fluid. If so, the pressure remains unchanged, rises slightly, or takes longer than 20 seconds to return to baseline.
- Observe that the physician fills three separate numbered containers with 5 to 10 mL in their appropriate sequence if laboratory analysis is desired. *In this way, if blood is present but in the least amount in the third container, its source is most likely trauma from the procedure rather than central nervous system pathology.*

- Place a Band-Aid or small dressing over the puncture site after the needle has been withdrawn. *The dressing acts as a barrier to microorganisms and absorbs drainage.*
- Position the client flat on the back or abdomen; instruct the client to remain flat and roll from side to side for the next 6 to 12 hours. *These measures reduce the potential for severe headache.*
- Reassess the client's neurologic status. Check the puncture site for bleeding or clear drainage. *Comparative data help the nurse to evaluate changes in the client's condition.*
- Offer oral fluids frequently. *They restore the volume of spinal fluid.*
- Label the specimens, if ordered, and send them to the laboratory with the appropriate requisition form. *Doing so facilitates appropriate analysis.*
- Document pertinent information such as the appearance of the fluid, client assessments, and disposition of the specimen. *Doing so adds essential data to the client's medical record.*

Collecting a Specimen for a Throat Culture

- Check with the physician about proceeding with the throat culture if the client is taking antibiotics. *Antibiotics affect test results.*
- Delay collecting a specimen if the client has recently used an antiseptic gargle. *Such gargle affects the test's diagnostic value.*
- Explain the purpose of and technique for obtaining the culture. *Explanations help to reduce anxiety and promote cooperation.*
- Collect supplies: sterile culture swab, glass slide, tongue blade, gloves, mask if the client is coughing, paper tissues, and an emesis basin if the client gags. *Doing so facilitates organization and efficient time management.*
- Have the client sit where light is optimum. *Light enhances inspection of the throat anatomy.*
- Don gloves and a mask, if necessary. *Their use reduces the potential for transferring microorganisms.*
- Loosen the cap on the tube in which the swab is located. *Doing so facilitates hand dexterity.*
- Tell the client to open the mouth wide, stick out the tongue, and tilt the head back. *This position promotes access to the back of the throat.*
- Depress the middle of the tongue with a tongue blade in your nondominant hand (Fig. 14-10). *Doing so opens the pathway for the swab.*
- Rub and twist the tip of the swab around the tonsil areas and back of the throat without touching the lips, teeth, or tongue. *Doing so transfers microorganisms from the inflamed tissue to the swab.*
- Be prepared for the client's gagging. *Stroking the back of the throat stimulates the gag reflex.*

- Remove the swab and discard the tongue blade in a lined receptacle. *This measure controls the spread of microorganisms.*
- Spread the secretions on the swab across the glass slide. *Doing so prepares a specimen for quick staining and microscopic examination.*
- Replace the swab securely within the tube, taking care not to touch the outside of the container. *This method avoids collecting unrelated microorganisms and provides containment for the collected specimen.*
- Crush the packet in the bottom of the tube. *Crushing releases nourishing fluid to promote bacterial growth.*
- Remove gloves, discard them in a lined receptacle, and wash your hands or perform hand antisepsis with an alcohol rub . *These steps reduce transmission of microorganisms.*
- Label the culture tube with the client's name, the date and time, and the source of the specimen. *These steps provide laboratory personnel with essential information.*
- Attend to staining and examination of the prepared glass slide, if appropriate. *Doing so provides tentative identification of streptococcal bacteria.*
- Deliver the sealed culture tube to the laboratory or refrigerate it if there will be a delay of longer than 1 hour. *These steps ensure that the microorganisms will grow when transferred to other culture media.*

Measures glucose in capillary blood

A **glucometer** is an instrument that measures the amount of glucose in capillary blood. It operates by assessing the amount of light reflected through a chemical test strip (Fig. 14-10).

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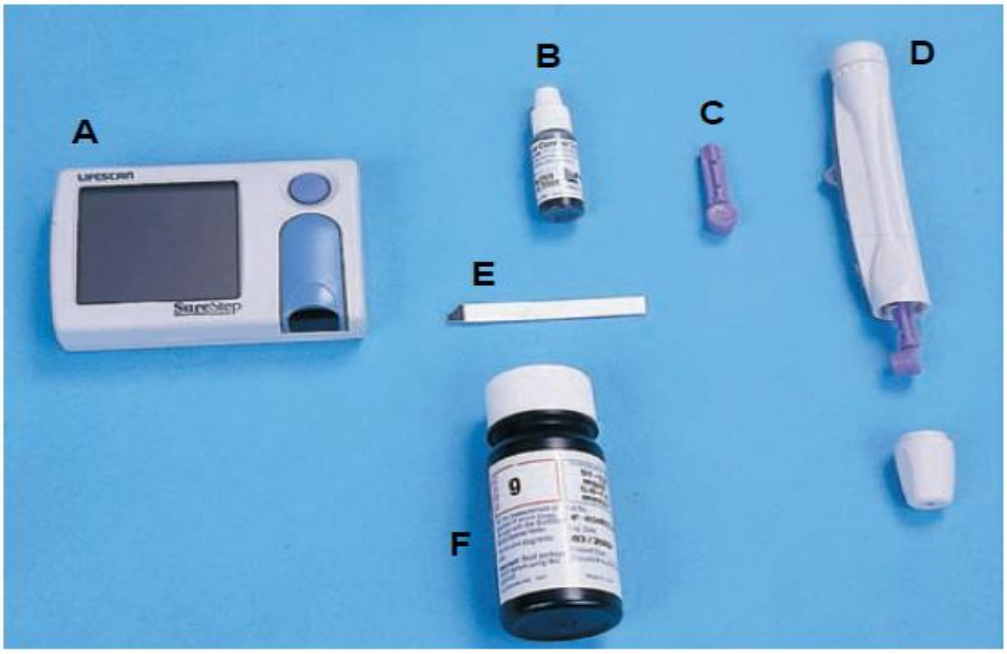


FIGURE 14-10 Equipment used to perform capillary blood glucose testing: a glucometer (**A**), control solution (**B**), a lancet (**C**), a lancet holder (**D**), a test strip (**E**), and a container of test strips (**F**). (Photo by B. Proud.)

There are several important points to remember about measuring blood glucose:

1. Several types of glucometers are available.
2. The blood glucose level usually is measured about 30 minutes before eating and before bedtime to determine what are likely to be the lowest levels of glucose.
3. Measuring blood glucose involves a risk for contact with blood. Because blood may contain infectious viruses, nurses wear gloves when performing this test.

Nursing Implications

- Anxiety
- Fear
- Impaired Adjustment
- Decisional Conflict
- Health-Seeking Behaviors
- Powerlessness
- Spiritual Distress

Critical Thinking Exercises

1. Discuss how the procedure for a sigmoidoscopy or another test or examination may differ if performed on an outpatient basis rather than in a hospital.

2. How might diminished mentation (the capacity to understand), reduced strength and stamina, and pain affect the performance of a diagnostic examination or test?

3. How might a pelvic examination be different if the person being examined is a victim of rape?

4. How can a nurse respond to a client who is uncertain about having a lumbar puncture because of a fear of paralysis from trauma to the spinal cord?

Fundamentals of Nursing II

By:

Dr. Abdulrahman Elhamss - Mr. Yamen Salem Qeshta - Mr. Adel Lafi

2020-2021

Table of Contents:

NURT 1310 Fundamentals of Nursing II

Credits: Three credits. (Theory)

Placement: Freshman year, Second semester

Prerequisites: Fundamentals of Nursing I

Course Description

The course is designed to introduce the student to the nursing skills & concepts in client care, making them knowledgeable and skillful when administering nursing care to clients. The purpose of this course is to offer a foundation in nursing to make sure that care from competent & concerned health care is provided whenever & wherever the need arises. Different concepts and skills will be taught to students to familiarize them with the clinical procedures**.**

Course Objectives

At the end of this course the student will be able to:

1. Identify types of exercises & discuss the complication of immobility.
2. State important legal aspect of chart ownership, access, confidentiality, and patient care documentation.
3. Identify types of exercises & discuss the complication of immobility.
4. Explain the procedure for applying sterile dry dressings, heat and cold therapy.
5. Discuss the purpose of & precautions taken with application of bandages & binders
6. Demonstrate understanding of nursing interventions for patient with nasogastric intubation.
7. Assess and evaluate nursing interventions for the patient receiving oxygen

8. Correctly prepare & administer therapeutic agents: oral medication, parenteral medications.
9. Demonstrate understanding of urinary & bowel elimination.
10. Discuss approaches to facilitate the grieving process
11. Describe nursing responsibilities in care of the body after death.

Course Outline

1. Nursing Process: The Model for Nursing
2. Vital Signs
3. Therapeutic Exercise
4. Ambulatory Aids
5. Wound Care
6. Gastrointestinal Intubation
7. Promoting Elimination
8. Urinary Elimination
9. Bowel Elimination
10. Medication Administration
11. Oral Medication
12. Topical and Inhalation Medication
13. Parenteral Medication
14. Airway Management
15. Caring for the Terminally Ill
16. Death and Dying

Teaching and Learning Methods

1. Lectures
2. Presentation
3. Homework
4. Audio-visual formats

Evaluation:

Attendance, participation, and quizzes	20%
Midterm Exams	30%
Final Exam	50%
	100%

Suggested References

Fundamental Nursing Skills & Concepts, Barbara k. Timby, 10th edition, 2013

Fundamental Nursing Skills & Concepts, Barbara k. Timby, 11th edition, 2017

Chapter I

Nursing Process

Learning Objectives

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

1. Define the term nursing process.
2. Describe seven characteristics of the nursing process.
3. List five steps in the nursing process.
4. Identify four sources of assessment data.
5. Differentiate between data base, focus, and functional assessments.
6. Distinguish between a nursing diagnosis and a collaborative problem.
7 . List three parts of a nursing diagnostic statement.
8. Describe the rationale for setting priorities.
9. Discuss appropriate circumstances for short-term and long-term goals.
10. Identify four ways to document a plan of care.
11. Describe the information that is documented in a plan of care.
12. Discuss three outcomes that result from an evaluation.

Nursing Process

- In the past, nursing practice consisted of actions based mostly on common sense and the examples set by older, more experienced nurses.
- Although nurses today continue to work interdependently with physicians and other health care practitioners, they now plan and implement client care more independently.

Definition of the Nursing Process

- **A process:** "A set of actions leading to a particular goal".
- **Nursing Process** **"**An Organized sequence of problem-solving steps"
  - ❖ Used to identify and manage the health problems of clients
  - ❖ Accepted standard for clinical practice: American Nurses Association (ANA)
  - ❖ Framework for nursing care

Characteristics of the Nursing Process

1. Within the legal scope of nursing**:** Nursing as an independent problem-solving role
2. Based on knowledge: Critical thinking helps nurses select appropriate evidence-based nursing interventions for achieving predictable outcomes.
3. Planned: The care should be organized and systematic.
4. Client centered: Comprehensive and unique plan of care for each client.
5. Goal directed a united effort between the client and the nursing team to achieve desired outcomes.
6. Prioritized focused way to resolve the problems that represent the greatest threat to health.
7. Dynamic: client status is not constant so it like loop.

Steps of the Nursing Process

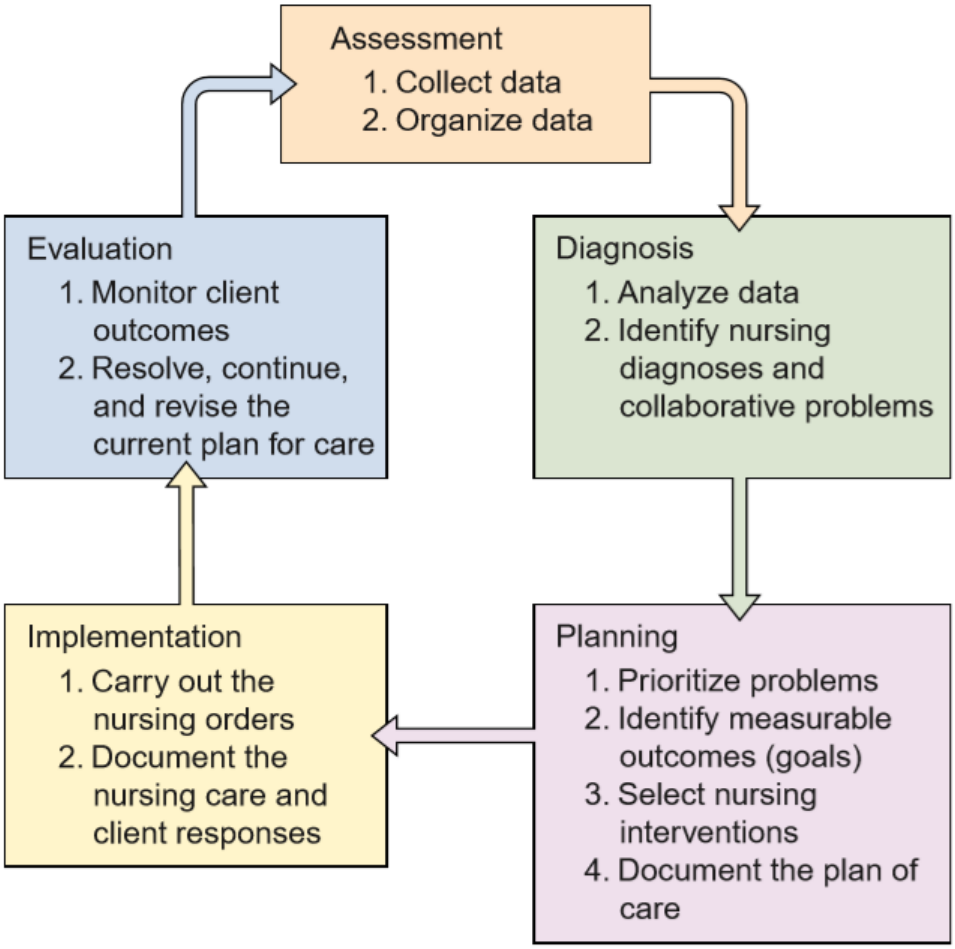


FIGURE 2-1 The steps in the nursing process.

Steps of the Nursing Process

1. **Assessment**
   - First step of nursing process.
   - Systematic collection of facts or data

- **Types of data**
  - **Objective data**: observable and measurable facts, referred to as **signs** of disorder
  - Example (BP , temperature, skin color)
  - **Subjective data:** information only client feels and can describe (and

sometimes family's); called **symptoms**

- Example (pain , nausea, fatigue)

Sources of data:

- Primary source :client;
- Secondary sources :client's family, reports, or discussion with other health care professionals

– Types of assessment

1. **Data base assessment**
   - Initial information: client's physical, emotional, social, and spiritual health
   - Obtained during admission interview and physical examination
   - Serves as reference for comparing all future data

2. **Focus assessment**

- Information: details about specific problems; expands original data base.
- Repeated frequently or on a scheduled basis

Example (The client tells the nurse that he has constipation)

3. **A functional assessment: Is a comprehensive evaluation of a client's physical strengths** and weaknesses in areas such as:
   A. The performance of activities of daily living.
   B. Cognitive abilities.
   C. Social functioning.

TABLE 2-1 Comparison of Data Base, Focus, and Functional Assessments

DATABASE ASSESSMENT	FOCUS ASSESSMENT	FUNCTIONAL ASSESSMENT
Obtained on admission	Compiled throughout subsequent care	Completed within the first 14 days of admission
Consists of predetermined questions and systematic head-to-toe examination	Consists of unstructured questions and a collection of physical assessments	Can follow various assessment tools, one of which is standardized minimum data set (MDS)
Performed once	Repeated each shift or more often	Repeated at least every 12 months or immediately after a significant change in physical or mental status; reviewed every 3 months
Suggests possible problems	Rules out or confirms problems	Identifies physical, psychological, and social factors that affect self-care
Findings documented on an admission assessment form	Findings documented on a checklist or in progress notes	Findings documented on various assessment tools, one of which is standardized MDS
Time-consuming; may take 1 hour or more	Completed in a brief amount of time (about 15 minutes)	Labor intensive; may involve a multidisciplinary team with final completion by an RN
Supplies a broad, comprehensive volume of data	Collects limited data	Comprehensive evaluation of current strengths and the potential for avoidable decline
Provides breadth for future comparisons	Adds depth to the initial database	Provides comparative data
Reflects the client's condition on entering the health care system	Provides comparative trends for evaluating the client's response to treatment	Data may also be used as a facility's quality indicator

Organization of Data

Interpreting the data is easier if the information is organized.

- Organization involves grouping related information.
- Nurses: organize assessment data; cluster related data using knowledge and past experiences

Example:

- **Assessment Findings**:

Headache, distended abdomen, dry hard passed stool with difficulty, fever, weak cough, thick sputum.

- **Related Clusters** :
  - Fever, Headache.

- Weak cough, thick sputum.
- Distended abdomen, dry hard passed stool with difficulty.

2. Diagnosis

- Second step of the nursing process.
- Identification of health-related problems.
- In this step there are:
    1. Analyzing data.
    2. Identifying NSG collaborative problems.
- **Nursing diagnosis**

  " Health issue that can be prevented, reduced, resolved, or enhanced through independent nursing measures."

  Nursing diagnoses are categorized into five groups;

  actual, risk, possible, syndrome, and wellness

Nursing Diagnosis Questions

- Are there problems here?
- If so, what are the specific problems?
- What are some possible causes?
- Is there a situation involving risk factors?
- What are the risk factors?
- What are the client's strengths?
- What data are available to answer these questions?
- Is more data needed?
- If so, what are the possible sources of further data?

Categories of Nursing Diagnosis:

TYPE	EXPLANATION AND EXAMPLE
Problem-focused diagnosis	A problem that currently exists *Impaired Physical Mobility related to pain as evidenced by limited range of motion, reluctance to move*
Risk diagnosis	A problem the client is uniquely at risk for developing *Risk for Deficient Fluid Volume related to persistent vomiting*
Syndrome diagnosis	Cluster of problems related to an event or situation that can be managed together (Carpenito-Moyet, 2012) *Rape Trauma Syndrome, Disuse Syndrome*
Health promotion diagnosis	A concern with which a healthy person desires nursing assistance to maintain or achieve a higher level of wellness *Readiness for Enhanced Immunization Status*

TYPE	EXPLANATION AND EXAMPLE
Actual diagnosis	A problem that currently exists *Impaired Physical Mobility related to pain as evidenced by limited range of motion, reluctance to move*
Risk diagnosis	A problem the client is uniquely at risk for developing *Risk for Deficient Fluid Volume related to persistent vomiting*
Possible diagnosis	A problem may be present, but requires more data collection to rule out or confirm its existence *Possible Parental Role Conflict related to impending divorce*
Syndrome diagnosis	Cluster of problems predicted to be present because of an event or situation (Carpenito-Moyet, 2009) *Rape Trauma Syndrome and Disuse Syndrome*
Wellness diagnosis	A health-related problem with which a healthy person obtains nursing assistance to maintain or perform at a higher level *Potential for Enhanced Breastfeeding*

- **Diagnostic statement**: A problem-focused nursing diagnostic statement contains :

  Three parts, sometimes referred to as **PES**.

  - **Name of the health related issue** or **p**roblem as identified in the NANDA list (North American Nursing Diagnosis Association)
  - **Etiology (its cause).** (Physiological, psychological, situational, cultural, environmental….).
  - **Signs and symptoms** : phrase "as manifested (or evidenced) by"

Diagnostic statement:

Example:

Parts of Nursing Diagnosis:

- Sleep pattern disturbance **= Problem.**
- Related to excessive intake of coffee = **Etiology.**
- That manifested by difficulty in falling a sleep, feeling tiered and irritability with others =**Signs and Symptoms**.

- **Collaborative problem**
  - Physiologic complications require both nurse- and physician-prescribed interventions

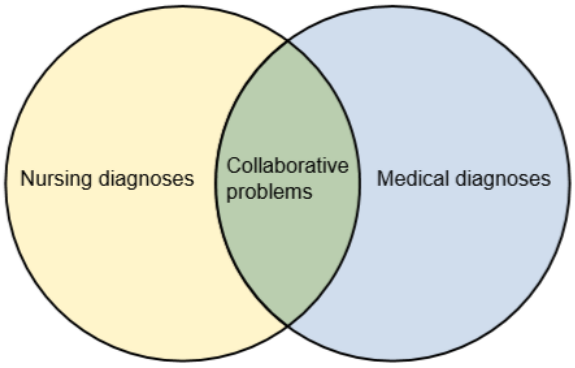


FIGURE 2-3 These two overlapping circles illustrate that the nurse independently treats nursing diagnoses. Doctors, other health professionals, and nurses work together on collaborative problems.

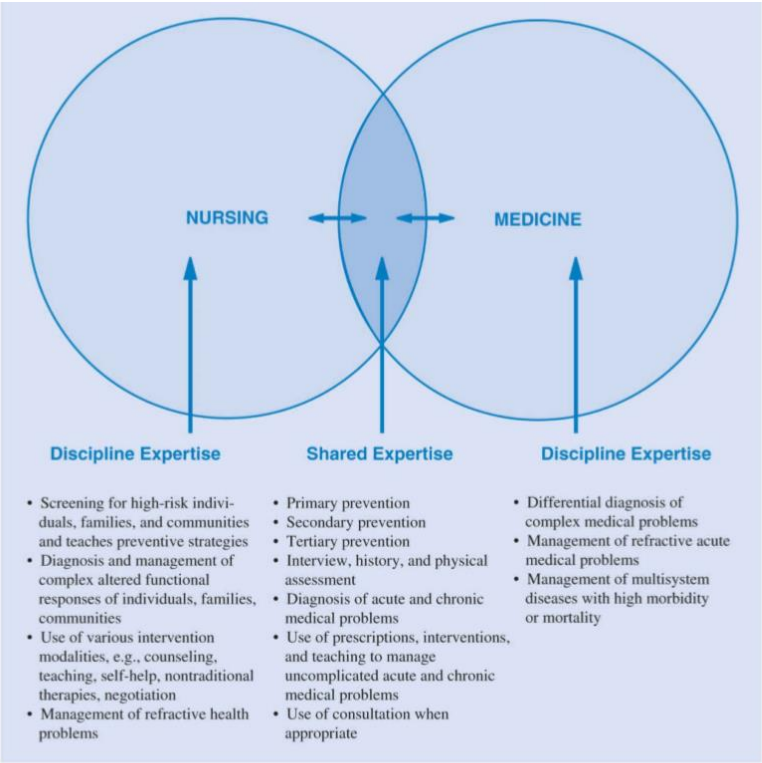


FIGURE 2-3 These two overlapping circles illustrate that the nurse independently treats nursing diagnoses. Doctors, other health providers, and nurses work together on collaborative problems. (From Carpenito, L. [2013]. *Nursing diagnosis* [14th ed., p. 5, Figure 1-1]. Philadelphia, PA: LWW.)

Example

- **Medical diagnosis**
  - Infection with AIDS virus
- **Possible Consequences**
  - Decreased blood cells that fight infection
- **Collaborative Problems**
  - Immunodeficiency

Examples for Nursing Dx and Goals

Ineffective Breathing Pattern

Definition

Inspiration and/or expiration that does not provide adequate ventilation

Defining Characteristics

Alterations in depth of breathing; altered chest excursion; assumption of three- point position; bradypnea; decreased expiratory pressure; decreased inspiratory pressure; decreased minute ventilation; decreased vital capacity; dyspnea; increased anterior-posterior diameter; nasal flaring; orthopnea; prolonged expiration phase; pursed-lip breathing; tachypnea; use of accessory muscles to breathe

Related Factors (r/t)

Anxiety; body position; bony deformity; chest wall deformity; cognitive impairment; fatigue; hyperventilation; hypoventilation syndrome; musculoskeletal impairment; neurological immaturity; neuromuscular dysfunction; obesity; pain; perception impairment; respiratory muscle fatigue; spinal cord injury

NOC (Nursing Outcomes Classification)

Suggested NOC Outcomes

Respiratory Status: Airway Patency, Ventilation; Vital Signs

Client Outcomes

Client Will (Specify Time Frame)

- Demonstrate a breathing pattern that supports blood gas results within the client's normal parameters
- Report ability to breathe comfortably
- Demonstrate ability to perform pursed-lip breathing and controlled breathing
- Identify and avoid specific factors that exacerbate episodes of ineffective breathing patterns

Nursing Interventions and Rationales

• Monitor respiratory rate, depth, and ease of respiration. Normal respiratory rate is 10 to 20 breaths/min in the adult .

• Note pattern of respiration. If client is dyspneic, note what seems to cause the dyspnea, the way in which the client deals with the condition, and how the dyspnea resolves or gets worse.

• Note amount of anxiety associated with the dyspnea.

Interrupted Family Processes

Definition

Change in family relationships and/or functioning

Defining Characteristics

Changes in assigned tasks; changes in availability for affective responsiveness; changes in availability for emotional support; changes in communication patterns; changes in effectiveness in completing assigned tasks; changes in expressions of conflict with community resources; changes in expressions of conflict within family; changes in expressions of isolation from community resources; changes in mutual support; changes in participation in decision- making; changes in participation in problem solving; changes in satisfaction with family; changes in somatic complaints; communication pattern changes; intimacy changes; pattern changes; power alliance changes; ritual changes; stress-reduction behavior changes

Related Factors (r/t)

Developmental crises; developmental transition; interaction with community; modification in family finances; modification in family social status; power shift of family members; shift in family roles; shift in health status of a family member; situation transition; situational crises

Client Outcomes

Family/Client Will (Specify Time Frame)

• Express feelings (family)

• Identify ways to cope effectively and use appropriate support systems (family)

• Treat impaired family member as normally as possible to avoid overdependence (family)

• Meet physical, psychosocial, and spiritual needs of members or seek appropriate assistance (family)

Imbalanced Nutrition: less than body requirements

Definition

Intake of nutrients insufficient to meet metabolic needs

Defining Characteristics

Abdominal cramping; abdominal pain; aversion to eating; body weight 20% or more under ideal; capillary fragility; diarrhea; excessive loss of hair; hyperactive bowel sounds; lack of food; lack of information; lack of interest in food; loss of weight with adequate food intake; misconceptions; misinformation; pale mucous membranes; perceived inability to ingest food; poor muscle tone; reported altered taste sensation; reported food intake less than RDA (recommended daily allowance); satiety immediately after ingesting food; sore buccal cavity; steatorrhea; weakness of muscles required for swallowing or mastication

Related Factors (r/t)

Biological factors; economic factors; inability to absorb nutrients; inability to digest food; inability to ingest food; psychological factors

Client Outcomes

Client Will (Specify Time Frame)

• Progressively gain weight toward desired goal

• Weigh within normal range for height and age

• Recognize factors contributing to underweight

• Identify nutritional requirements

• Consume adequate nourishment

• Be free of signs of malnutrition

Risk for imbalanced Nutrition: more than body requirements

Definition

At risk for intake of nutrients that exceeds metabolic needs

Risk Factors

Concentrating food at the end of day; dysfunctional eating patterns; eating in response to external cues (e.g., time of day, social situation); eating in response to internal cues other than hunger (e.g., anxiety); higher baseline weight at beginning of each pregnancy; observed use of food as comfort measure; observed use of food as reward; pairing food with other activities; parental obesity; rapid transition across growth percentiles in children; reported use of solid food as major food source before 5 months of age

Related Factors (r/t)

Excessive intake in relation to metabolic need

Client Outcomes

Client Will (Specify Time Frame)

• State pertinent factors contributing to weight gain

• Identify behaviors that remain under client's control

• Design dietary modifications to meet individual long-term goal of weightcontrol

• Lose weight in a reasonable period (1 to 2 lb per week)

- Incorporate increased exercise requiring energy expenditure into daily life

Table 3.2 *Proposed Taxonomy III Domains, Classes, and Nursing Diagnoses*

PHYSIOLOGICAL DOMAIN ***Anatomical structures and physiological processes essential to human health***	
Class: Circulation Anatomical structures and physiological processes involved in vital and peripheral circulation	Nursing Diagnosis Code
Decreased cardiac output	00029
Risk for decreased cardiac output	00240
Risk for decreased cardiac tissue perfusion	00200
Risk for impaired cardiovascular function	00239
Risk for ineffective cerebral tissue perfusion	00201
Risk for ineffective gastrointestinal perfusion	00202
Risk for ineffective renal perfusion	00203
Ineffective peripheral tissue perfusion	00204
Risk for ineffective peripheral tissue perfusion	00228
Class: Respiration Anatomical structures and physiological processes involved in ventilation and gas exchange	Nursing Diagnosis Code
Ineffective airway clearance	00031
Ineffective breathing pattern	00032
Impaired gas exchange	00030
Impaired spontaneous ventilation	00033
Dysfunctional ventilatory weaning response	00034
Class: Physical Regulation Anatomical structures and physiological processes involved in hematological, immunological, and metabolic regulatory mechanisms	Nursing Diagnosis Code
Risk for adverse reaction to iodinated contrast media	00218
Risk for allergy response	00217
Risk for unstable blood glucose level	00179
Risk for imbalanced body temperature	00005
Risk for electrolyte imbalance	00195
Readiness for enhanced fluid balance	00160
Deficient fluid volume	00027
Risk for deficient fluid volume	00028
Excess fluid volume	00026
Risk for imbalanced fluid volume	00025

Continued

Table 3.2 *Continued*

Hyperthermia	00007
Risk for hyperthermia	00253
Hypothermia	00006
Risk for hypothermia	00253
Risk for perioperative hypothermia	00254
Neonatal jaundice	00194
Risk for neonatal jaundice	00230
Latex allergy response	00041
Risk for latex allergy response	00042
Risk for impaired liver function	00178
Ineffective thermoregulation	00008
Class: Nutrition Anatomical structures and physiological processes involved in the ingestion, digestion, and absorption of nutrients	Nursing Diagnosis Code
Insufficient breast milk	00216
Ineffective breastfeeding	00104
Interrupted breastfeeding	00105
Readiness for enhanced breastfeeding	00106
Ineffective infant feeding pattern	00107
Imbalanced nutrition: less than body requirements	00002
Readiness for enhanced nutrition	00163
Obesity	00232
Overweight	00233
Risk for overweight	00234
Class: Elimination Anatomical structures and physiological processes involved in discharge of body waste	Nursing Diagnosis Code
Bowel incontinence	00014
Constipation	00011
Risk for constipation	00015
Perceived constipation	00012
Chronic functional constipation	00235
Diarrhea	00013
Dysfunctional gastrointestinal motility	00196
Risk for dysfunctional gastrointestinal motility	00197
Impaired urinary elimination	00016
Readiness for enhanced urinary elimination	00166
Functional urinary incontinence	00020
Overflow urinary incontinence	00176
Reflex urinary incontinence	00018

Table 3.2 *Continued*

Stress urinary incontinence	00017
Urge urinary incontinence	00019
Risk for urge urinary incontinence	00022
Urinary retention	00023
Risk for urinary tract injury	00250
Class: Skin/Tissue Anatomical structures and physiological processes of skin and body tissues involved in structural integrity	Nursing Diagnosis Code
Risk for corneal injury	00245
Impaired dentition	00048
Risk for dry eye	00219
Impaired oral mucous membrane	00045
Risk for impaired oral mucous membrane	00247
Risk for pressure ulcer	00249
Impaired skin integrity	00046
Risk for impaired skin integrity	00047
Risk for thermal injury	00220
Impaired tissue integrity	00044
Risk for impaired tissue integrity	00248
Risk for vascular trauma	00213
Class: Neurological Response Anatomical structures and physiological processes involved in the transmission of nerve impulses	Nursing Diagnosis Code
Decreased intracranial adaptive capacity	00049
Autonomic dysreflexia	00009
Risk for autonomic dysreflexia	00010
Disorganized infant behavior	00116
Readiness for enhanced organized infant behavior	00117
Risk for disorganized infant behavior	00115
Risk for peripheral neurovascular dysfunction	00086
Unilateral neglect	00123
MENTAL DOMAIN *Mental processes and mental patterns essential to human health*	
Class: Cognition Neuropsychological processes involved in orientation, information processing, and memory	Nursing Diagnosis Code
Acute confusion	00128

Continued

Table 3.2 *Continued*

Risk for acute confusion	00173
Chronic confusion	00129
Impaired memory	00131
Class: Self-Concept Psychological patterns involved in self-perception, identity, and self-regulation	Nursing Diagnosis Code
Disturbed body image	00118
Ineffective denial	00072
Labile emotional control	00251
Ineffective impulse control	00222
Chronic low self-esteem	00119
Risk for chronic low self-esteem	00224
Situational low self-esteem	00120
Risk for situational low self-esteem	00153
Disturbed personal identity	00121
Risk for disturbed personal identity	00225
Readiness for enhanced self-concept	00167
Sexual dysfunction	00059
Ineffective sexuality pattern	00065
Class: Mood Regulation Biophysical and emotional interaction processes involved in mood regulation	Nursing Diagnosis Code
Impaired mood regulation	00241
EXISTENTIAL DOMAIN *Experiences and life perceptions essential to human health*	
Class: Comfort Perceptions of symptoms and experience of suffering	Nursing Diagnosis Code
Anxiety	00146
Impaired comfort	00214
Readiness for enhanced comfort	00183
Death anxiety	00147
Fear	00148
Acute pain	00132
Chronic pain	00133
Labor pain	00256
Chronic pain syndrome	00255

Table 3.2 *Continued*

Nausea	00134
Chronic sorrow	00137
Class: Well-Being Perceptions of life qualities and experience of existential needs satisfaction	Nursing Diagnosis Code
Grieving	00136
Complicated grieving	00135
Risk for complicated grieving	00172
Readiness for enhanced hope	00185
Hopelessness	00124
Risk for compromised human dignity	00174
Readiness for enhanced power	00187
Powerlessness	00125
Risk for powerlessness	00152
Spiritual distress	00066
Risk for spiritual distress	00067
Readiness for enhanced spiritual well-being	00068
Class: Life Principles Personal values, beliefs, and religiosity	Nursing Diagnosis Code
Decisional conflict	00083
Moral distress	00175
Noncompliance	00079
Impaired religiosity	00169
Readiness for enhanced religiosity	00171
Risk for impaired religiosity	00170
Class: Coping Perceptions of coping, coping experiences, and coping strategies	Nursing Diagnosis Code
Ineffective activity planning	00199
Risk for ineffective activity planning	00226
Defensive coping	00071
Ineffective coping	00069
Readiness for enhanced coping	00158
Readiness for enhanced decision-making	00184
Impaired emancipated decision-making	00242
Readiness for enhanced emancipated decision-making	00243
Risk for impaired emancipated decision-making	00244
Post-trauma syndrome	00141

Continued

Table 3.2 *Continued*

Risk for post-trauma syndrome	00145
Rape-trauma syndrome	00142
Relocation stress syndrome	00114
Risk for relocation stress syndrome	00149
Impaired resilience	00210
Readiness for enhanced resilience	00212
Risk for impaired resilience	00211
Stress overload	00177
FUNCTIONAL DOMAIN ***Life-span processes, basic functions, and skills essential to human health***	
Class: Lifespan Processes The processes of growth, mental development, physical maturation, and aging	Nursing Diagnosis Code
Risk for delayed development	00112
Risk for disproportionate growth	00113
Class: Physical Ability Audiovisual abilities, sexual function, and mobility	Nursing Diagnosis Code
Impaired bed mobility	00091
Impaired physical mobility	00085
Impaired wheelchair mobility	00089
Impaired sitting	00237
Impaired standing	00238
Impaired transfer ability	00090
Impaired walking	00088
Class: Energy Balance Energy usage and energy regulation pattern	Nursing Diagnosis Code
Activity intolerance	00092
Risk for activity intolerance	00094
Deficient diversional activity	00097
Fatigue	00093
Insomnia	00095
Sedentary lifestyle	00168
Readiness for enhanced sleep	00165
Sleep deprivation	00096
Disturbed sleep pattern	00198
Wandering	00154

Table 3.2 *Continued*

Class: Communication Communication abilities and communication skills	Nursing Diagnosis Code
Readiness for enhanced communication	00157
Impaired verbal communication	00051
Class: Social Function Social network, social roles, social skills, and social interaction	Nursing Diagnosis Code
Risk for loneliness	00054
Readiness for enhanced relationship	00207
Ineffective relationship	00223
Risk for ineffective relationship	00229
Ineffective role performance	00055
Impaired social interaction	00052
Social isolation	00053
Class: Self Care Self-care abilities and home maintenance skills	Nursing Diagnosis Code
Impaired home maintenance	00098
Bathing self-care deficit	00108
Dressing self-care deficit	00109
Feeding self-care deficit	00102
Toileting self-care deficit	00110
Readiness for enhanced self-care	00182
Self-neglect	00193
Class: Health Promotion Health literacy and health maintenance skills	Nursing Diagnosis Code
Ineffective health maintenance	00099
Ineffective health management	00078
Readiness for enhanced health management	00162
Frail elderly syndrome	00230
Risk for frail elderly syndrome	00231
Ineffective protection	00043
Risk-prone health behavior	00188
Deficient knowledge	00126
Readiness for enhanced knowledge	00161

Continued

Table 3.2 *Continued*

SAFETY DOMAIN *The characteristics of risk behavior, health hazards, and milieu hazards essential to human health*	
Class: Self-Harm Self-directed risk behavior and suicidal behavior	Nursing Diagnosis Code
Self-mutilation	00151
Risk for self-mutilation	00139
Risk for self-directed violence	00140
Risk for suicide	00150
Class: Violence Other-directed risk behavior and violent behavior	Nursing Diagnosis Code
Risk for other-directed violence	00138
Class: Health Hazard Health hazards associated with healthcare processes and social processes	Nursing Diagnosis Code
Risk for aspiration	00039
Risk for bleeding	00206
Risk for disuse syndrome	00040
Risk for falls	00155
Risk for infection	00004
Risk for injury	00035
Risk for perioperative positioning injury	00087
Risk for shock	00205
Risk for sudden infant death syndrome	00156
Risk for suffocation	00036
Delayed surgical recovery	00100
Risk for delayed surgical recovery	00246
Impaired swallowing	00103
Risk for trauma	00038
Class: Milieu Hazard Health impacts of economy, housing standard, and working environment	Nursing Diagnosis Code
Contamination	00181
Risk for contamination	00180
Risk for poisoning	00037

Table 3.2 *Continued*

FAMILY *Reproductive processes, family processes, and family roles essential to human health*	
Class: Reproduction Biophysical and psychological processes involved in fertility and conception, and the delivery and postpartum phase of childbirth	Nursing Diagnosis Code
Ineffective childbearing process	00221
Readiness for enhanced childbearing process	00208
Risk for ineffective childbearing process	00227
Risk for disturbed maternal–fetal dyad	00209
Class: Caregiving Roles Caregiving and caregiver functions	Nursing Diagnosis Code
Risk for impaired attachment	00058
Caregiver role strain	00061
Risk for caregiver role strain	00062
Parental role conflict	00064
Impaired parenting	00056
Risk for impaired parenting	00057
Readiness for enhanced parenting	00164
Class: Family Unit Family coping, family functionality, and family integrity	Nursing Diagnosis Code
Compromised family coping	00074
Disabled family coping	00073
Readiness for enhanced family coping	00075
Ineffective family health management	00080
Dysfunctional family processes	00063
Interrupted family processes	00060
Readiness for enhanced family processes	00159

Continued

ENVIRONMENTAL DOMAIN *Healthcare system and healthcare processes essential to human health*	
Class: Community Health Community health needs, risk populations, and healthcare programs	Nursing Diagnosis Code
Deficient community health management	00215
Ineffective community coping	00077
Readiness for enhanced community coping	00076
Class: Healthcare System Healthcare system, healthcare legislations, hospitals treatment, and care processes	Nursing Diagnosis Code
None at present	

References

Abbot, A. (1988) *The Systems of Professions*. Chicago, IL: University of Chicago Press.

Quammen, D. (2007) A passion for order. *National Geographic Magazine*. ngm.nationalgeographic.com/print/2007/06/Linnaeus-name-giver/david-quammen-text, retrieved November 1, 2013.

Von Krogh, G. (2011) Taxonomy III Proposal. *NANDA International Latin American Symposium*. Sao Paulo, Brazil. May 2011.

3. Planning

– Third step of the nursing process

1. Setting priorities

- Prioritization involves ranking from those that are most serious or immediate to those of lesser importance (Maslow's Hierarchy of Human Needs can be used) "Physiologic, Safety and Security, Love and belonging, Esteem and self-esteem, Self-actualization"

TABLE 2-4 Prioritizing Nursing Diagnoses

HUMAN NEED	EXAMPLES OF NURSING DIAGNOSES
Physiologic	Imbalanced nutrition: less than body requirements
	Ineffective breathing pattern
	Pain
	Impaired swallowing
	Urinary retention
Safety and security	Risk for injury
	Impaired verbal communication
	Disturbed thought processes
	Anxiety
	Fear
Love and belonging	Social isolation
	Impaired social interactions
	Interrupted family processes
	Parental role conflict
Esteem and self-esteem	Disturbed body image
	Powerlessness
	Caregiver role strain
	Ineffective breastfeeding
Self-actualization	Delayed growth and development
	Spiritual distress

2. Establishing goals

Goal: expected or desired outcome

A. Short-term goals:

– Outcomes achievable in a few days to 1 week.

– Used more often in acute care.

<u>Characteristics of Short-Term Goals:</u>

- *Developed from the problem portion of the diagnostic statement.*
- *Patient centered: Reflecting what the client will accomplish.*

- *Measurable: Criteria that provide evidence of goal achievement*
- *Realistic: Avoid setting unattainable goals*
- *Accompanied by a target date for accomplishment: Predicted time when the goal will be met.*

Example /Short-term goals:

BOX 2-6 Components of Short-Term Goals

Nursing Diagnostic Statement

Constipation related to decreased fluid intake, lack of dietary fiber, and lack of exercise as manifested by no normal bowel movement for the past 3 days, abdominal cramping, and straining to pass stool

Short-Term Goal

The client will	client-centered
have a bowel movement	identifies measurable criteria that reflect the problem portion of the diagnostic statement
in 2 days (specify date)	identifies a target date for achievement within a realistic time frame

B. Long-term goals

- Desirable outcomes that take weeks or months to accomplish.
- Are used more often in chronic health problems.
- Client is more likely to achieve long-term goals during care at home or in other community settings.
- Outcome has more details than **Short- Term Goals**

C. Goals for collaborative problems

- Written from the nurse.
- Focus on what the nurse will monitor, report, record, or do to promote early detection and treatment.
- The format for writing a nursing goal is, "The nurse will manage and minimize , will be managed and minimized by (evidence).

Goals versus Outcome:

- **Goal *: (General)***

  The client will be hydrated by 8/23.

- **Outcome *: (Specific)***

  The client will have adequate hydration as evidenced by an oral intake between 2,000-3,000 ml/24 hours and a urine out put +/- 500 ml of the intake amount by 8/23

- **Selecting nursing intervention**
  - Planning measures: to accomplish identified goals involves critical thinking.
  - Nursing interventions are directed at eliminating the etiologies.
  - Planned interventions: must be safe; within legal scope of nursing practice; and compatible with medical orders.
  - Initial interventions generally are limited to selected measures with the potential for success.

- **Documenting plan of care**
  - **Plan of care**: written by hand; standardized form; computer generated; based on an agency's written standards or clinical pathways
  - **Nursing order**:(directions for patient's care) identify the what, when, where, and how for performing nursing interventions; providing specific instructions. all health team members understand exactly what to do for the client.

- Communicating the plan of care
  - Nurses share plan with nursing team members, client, and the client's family
  - Permanent part of client's medical record placed in client's chart; nurses refer to it, review it, and revise it.

4. Implementation

- Fourth step in the nursing process: means carrying out the plan of care. The nurse implements medical orders as well as nursing orders.

Implementation of:

- Medical records: legal evidence
- Record: quantity and quality of client response

5. Evaluation

- Fifth and final step of the nursing process: nurses determine whether client has reached the goal
- Both the nurse and the client can decide on what activities need to be discontinued, added, or changed.
- Analyze client's response

TABLE 2-5 Outcomes from Evaluation

ANALYSIS	REASON	ACTION
The client has reached the goals	Plan was effective and implemented consistently	Discontinue the nursing orders
The client has made some progress	Care has been inconsistent	Check that nursing orders are clear and specific
	Target date was too ambitious	Continue care as planned; readjust target date
	Client's response has been less than expected	Revise the plan by adding nursing interventions or more frequent implementation
The client has made no progress	The initial diagnosis was inaccurate	Revise problem list; write new goals and nursing orders
	New problems have occurred	Add new problems, goals, and nursing orders
	The target date was unrealistic	Revise expected date for achievement
	Nursing interventions were ineffective	Add new nursing orders; discontinue ineffective measures; readjust target date

Use of the Nursing Process

- Standard for clinical nursing practice
- Nurse practice act
  - Holds nurses accountable for demonstrating all the steps in the nursing process
  - To do less implies negligence

NURSING GUIDELINES 2-1

Using the Nursing Process

- Collect information about the client. Data collection is the basis for identifying problems.
- Organize the data. Organizing related data simplifies the process of analysis.
- Analyze the data for what is normal and abnormal. Abnormalities provide clues to the client's problems.
- Identify actual, risk, possible, syndrome, and wellness nursing diagnoses and collaborative problems. Problem identification directs the nurse to select methods for maintaining or restoring the client's health.
- Prioritize the problem list. Setting priorities targets problems that require the most immediate attention.
- Set goals with specific criteria for evaluating whether the problems have been prevented, reduced, or resolved. Goals predict the expected outcomes from nursing care.
- Select a limited number of appropriate nursing interventions. The nurse uses evidence-based knowledge to determine which measures will be most effective in accomplishing the goals of care.
- Give specific directions for nursing care. Specific directions promote consistency and continuity among caregivers.
- Document the plan for care using whatever written format is acceptable. A written plan provides a means of communication and reference for the nursing team to follow.
- Discuss the plan with nursing team members, the client, and the family. Verbally sharing the plan ensures that everyone is informed and goal directed.
- Put the plan into action. Work produces results.
- Observe the client's responses. Evaluating outcomes is the basis for determining the effectiveness of the plan of care.
- Chart all nursing activities and the client's responses. Documentation demonstrates that planned care has been implemented and provides information about the client's progress.
- Compare the client's responses with the goal criteria. If the planned care is appropriate, there should be some measure of progress toward accomplishing goals.
- Discuss the progress, or lack of it, with the client, family, and other nursing team members. Pooling resources may provide better alternatives when revising the plan of care.
- Change the plan in areas that are no longer appropriate. The nursing care plan changes according to the needs of the client.
- Continue to implement and evaluate the revised plan of care. The nursing process is a continuous sequence of actions that is repeated until the goals have been met.

Chapter 2

Vital Signs

Learning Objectives

On completion of this chapter, the students should be able to:

1. List four physiologic components measured during an assessment of vital signs.
2. Differentiate between shell and core body temperature.
3. Identify the two scales used to measure temperature.
4. List four temperature assessment sites and indicate the sites considered the closest to core temperature.
5. Name four types of clinical thermometers.
6. Discuss the difference between fever and hyperthermia.
7. Name the four phases of a fever.
8. List at least four signs or symptoms that accompany a fever.
9. Give two reasons for using an infrared tympanic thermometer when body temperature is subnormal.
10. Describe the technique for assessing body temperature with a temporal artery thermometer.
11. List at least four signs and symptoms that accompany subnormal body temperature.
12. Identify three characteristics noted when assessing a client's pulse.
13. Name the most commonly used site for pulse assessment and three other assessment techniques that may be used.
14. Explain the difference between systolic and diastolic blood pressure.
15. Name and explain at least four terms used to describe abnormal breathing characteristics.
16. Discuss the physiologic data that can be inferred from a blood pressure assessment.
17. Name three pieces of equipment for assessing blood pressure.
18. Describe the five phases of Korotkoff sounds.
19. Identify three alternative techniques for assessing blood pressure.

Vital Signs

Vital Signs

Four objective assessment data that indicate how well or how poorly the body is functioning.

1. Body temperature
2. Pulse
3. Respiratory rate
4. Blood pressure
5. Pain

nurses measure them at regular intervals (Box 12-1) or whenever they determine it is appropriate to assess a client's health status.

Assessing a Client's Health Status

BOX 12-1 Recommendations for Measuring Vital Signs

Vital signs are taken:

- On admission, when obtaining database assessments
- According to written medical orders
- Once per day when a client is stable
- At least every 4 hours when one or more vital signs are abnormal
- Every 5 to 15 minutes when a client is unstable or at risk for rapid physiologic changes such as after surgery
- Whenever a client's condition appears to have changed
- A second time, or more frequently, when there is a significant difference from the previous measurement
- When a client is feeling unusual
- Before, during, and after a blood transfusion
- Before administering medications that affect any of the vital signs and after to monitor the drug's effect

Body Temperature

- Refers to the warmth of the human body.
- Body heat produced primarily by exercise and the metabolism of food .
- **Shell temperature:** The warmth at the skin surface (is usually lower than core temp.)
- **Core temperature:** The warmth in deeper sites within the body like the brain and heart
  - The body's core temperature is much more significant than shell temperature.

Mechanism of Heat Transfer

- **Radiation**
- **Conduction**
- **Convection**
- **Evaporation**

TABLE 12-1 Mechanisms of Heat Transfer

	RADIATION	CONVECTION	EVAPORATION	CONDUCTION
Definition	The diffusion or dissemination of heat by electromagnetic waves.	The dissemination of heat by motion between areas of unequal density.	The conversion of a liquid to a vapor.	The transfer of heat to another object during direct contact.
Example	The body gives off waves of heat from uncovered surfaces.	An oscillating fan blows currents of cool air across the surface of a warm body.	Body fluid in the form of perspiration and insensible loss is vaporized from the skin.	The body transfers heat to an ice pack, causing the ice to melt.
Illustration				

Normal Body Temperature

- In normal, healthy adults, shell temperature generally ranges from 96.6˚F to 99.3˚F or (35.8˚C to 37.4˚C),
- and **Core temperature** ranges from 97.5 ˚F to 100.4 ˚F **(**36.4 ˚C – 37.3 ˚C)
- Chances of survival diminish if body temperatures exceed 110˚F (43.3˚C) or fall below 84˚F (28.8˚C)
- **Temperature regulation:**
  - **Hypothalamus "** a structure within the brain, that regulates temperature **"**

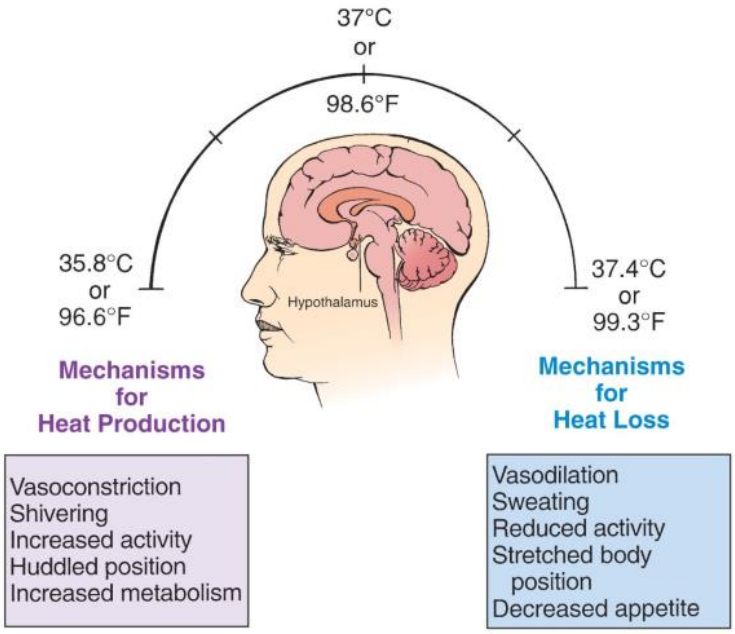


FIGURE 12-1 The hypothalamus regulates body temperature.

Temperature Measurement

- Fahrenheit scale: uses 32˚F as the temperature at which water freezes and 212˚F as the point at which it boils
- Centigrade scale: uses 0˚C as the temperature at which water freezes and 100˚C as the point at which it boils
- **How to convert:**

1. ˚C = **(**˚F **– 32)/ 1.8**
2. ˚F = **(**˚C **x 1.8) + 32**

Regulation of body temperature by Hypothalamus

Mechanism for heat production:

- Vasoconstriction.
- Shivering.
- Increased activity.
- Huddled (منكمش) position.
- Increased metabolism

Mechanism for heat loss:

- Vasodilatation.
- Sweating.
- Reduced activity.
- Stretched body position.
- Decreased appetite

Factors Affecting Body Temperature

1. Food intake: thermogenesis (heat production**)**
2. Age: Infants and older adults have difficulty maintaining normal body temperature
3. Gender: Body temperature increases slightly in women of childbearing age during ovulation.
4. Climate: Heat and cold produce neurosensory stimulation of thermal receptors in the skin,
5. Exercise and activity: Both exercise and activity involve muscle contraction
6. Circadian rhythm: Physiologic changes.
7. Emotions: Affect metabolic rate by triggering hormonal changes
8. Illness or Injury.
9. Medications (drugs): increas-ing or decreasing metabolic rate and energy requirements.

Assessment Sites

- **Accurate assessment site:**
  - Brain, heart, lower third of the esophagus, and urinary bladder
- **Practical and convenient assessment sites:**

1. **Oral Site**: proximal to sublingual artery (0.5 ˚C - 0.6 ˚C) below core temp.
   - **Contraindications:**
     - For patient who are uncooperative.
     - Unconscious.
     - Very young.
     - Those who have oral surgery.
     - Mouth breathers.
     - And those who prone to seizure
   - **Duration : 3- 5 minutes**

2. **Rectal site :**
   - (0.1 °C) below core temp
   - Most accurate site for measuring temperature.
   - Embarrassing.
   - Presence of stool affects the accuracy.
   - **Duration: (1) minute**

3. **Axillary site (under arm):**
   - 0.6 ˚C lower than oral.
   - Best site for infants and newborns.
   - Accessible, safe, low infection, low embarrassing.
   - **Duration : 3- 5 minutes**

4. The Ear

- Tympanic Membrane near hypothalamus.
- Blood supply from carotid artery supplying the hypothalamus.
- More reliable than oral and axilla.
- More fast.
- **Duration: seconds**

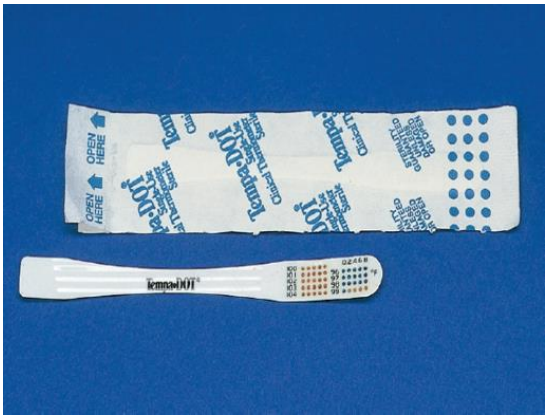
- **N.B.**
  - When measuring temperature from **Axilla**, we add 0.6 ˚C.
  - When measuring temperature from **Rectum**, we abstract 0.5 ˚C.
  - When measuring temperature from **Mouth**, we document it without changing

Clinical Thermometers

Instruments used to measure body temperature

1. Digital
2. Glass
3. Electronic Thermometer

4. Chemical Thermometer



5. Tympanic Thermometer

Elevated Body Temperature

- Fever is a condition in which the body temperature exceeds 99.3˚F (37.4˚C).
    1. A person with a fever is said to be Febrile.
    2. A person with normal temp is said to be Afebrile.
- Pyrexia is a condition in which the temperature is warmer than the normal set point
- Hyperthermia is a condition in which core temperature is excessively high and the temperature exceeds 105.8˚F (40.6˚C)

Common signs and symptoms of Fever

1. Pinkish, red (flushed) skin that is warm to the touch
2. Restlessness in some or excessive sleepiness in others
3. Irritability.
4. poor appetite
5. Increased perspiration
6. Headache
7. Above-normal pulse and respiratory rates
8. Disorientation and confusion (when the temperature is very high)
9. Convulsions in infants and children (when the temperature is very high)
10. Fever blisters about the nose or lips (sometimes)

Phases of Fever

1. Prodromal phase :
    - No specific symptoms just before the temperature rise.
    - Mild headache.
    - Lethargy.
    - Reduced appetite.
    - Muscle aches.
2. Onset or Invasive Phase:
    - Obvious mechanisms for increasing body temperature
    - Pale.
    - Shivering.
    - Feels cold.
3. Stationary Phase:

- Fever is sustained.
- Flushed skin.
- Feels hot.

4. Resolution Phase:
    - Sweating begins.
    - Temperature return to normal

Phases of Fever and Physiologic Changes

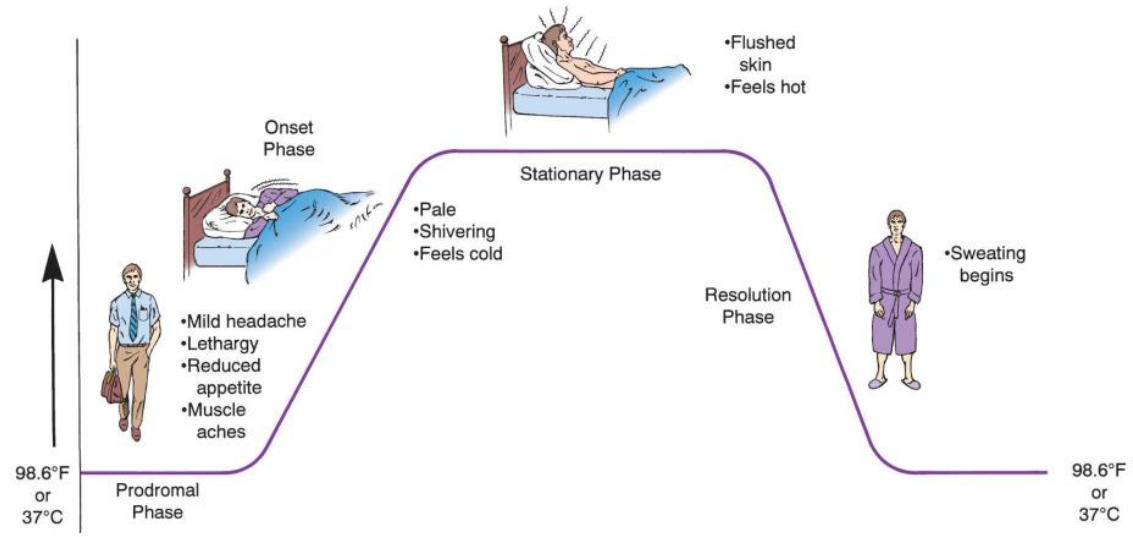


FIGURE 12-11 Phases of a fever and physiologic changes.

TABLE 12-4 Variations in Fever Patterns

TYPE OF FEVER	DESCRIPTION
Sustained fever	Remains elevated with little fluctuation
Remittent fever	Fluctuates several degrees but never reaches normal between fluctuations
Intermittent fever	Cycles frequently between periods of normal or subnormal temperatures and spikes of fever
Relapsing fever	Recurs after a brief but sustained period during which temperature has been normal

Nursing managements

A fever is considered an important body defense for destroying infectious microorganism.

1. Increase fluids intake.
2. Rest.
3. Antipyretics.
4. Provide light diet, low caloric.
5. Cold compresses (on forehead, axillary, groin area (pelvic).
6. Apply tepid water to the skin
7. Increase room ventilation.

Discontinue physical cooling measures if the client begins to shiver.

Hypothermia

- Core body temperature less than 95˚F (35˚C)
- Mildly hypothermic: 95˚F to 93.2˚F (35˚C to 34˚C)
- Moderately hypothermic: 93˚F to 86˚F (33.8˚C to 30˚C)
- Severely hypothermic: below 86˚F (30˚C)

Symptoms of Hypothermia

1. Shivering until body temperature is extremely low
2. Pale, cool, and puffy (swollen) skin
3. Impaired muscle coordination
4. Slow pulse and respiratory rates
5. Irregular heart rhythm
6. Incoherent thinking.
7. Diminished pain sensation

Nursing managements

1. Raise room temperature.
2. Remove wet clothing to reduce heat loss.
3. More clothes and covers.
4. Put arms and legs like fetus position.
5. Cover the head.
6. Provide warm fluids.
7. Massage the skin to produce warmth.
8. Warm compresses.

Pulse

- Produced by the movement of blood during the heart's contraction
- wave-like sensation that can be palpated in peripheral arteries."
- In most adults, the heart contracts 60 to 100 times per minute at rest
- **Pulse rate**: number of peripheral pulsation in a minute

1. **Rapid pulse rate:**

- **Tachycardia** (heart rate between 100 and 150 b/m for older adults).
- **Palpitation** (awareness of one's own heart contraction without having to feel the pulse).

2. Slow pulse rate: **Bradycardia** (heart rate less than 60 b/m).

TABLE 12-5 Normal Pulse Rates Per Minute at Various Ages

AGE	APPROXIMATE RANGE	APPROXIMATE AVERAGE
Newborn	120–160	140
1–12 months	80–140	120
1–2 years	80–130	110
3–6 years	75–120	100
7–12 years	75–110	95
Adolescence	60–100	80
Adulthood	60–100	80

Factors affecting pulse and heart rate

1. **Age.**
2. *Circadian rhythm.* Rates tend to be lower in the morning and increase later in the day.
3. **Gender:** women is about 7 or 8 bpm faster

4. **Body built** (tall person usually has slower heart and pulse rate than short)
5. **Exercise activity:** rates increase with exercise and activity and decrease with rest.
6. **Stress and emotions**: stimulation of sympathetic nervous system and emotions such as anger, fear increase heart rate and pulse rate.
7. **Body temperature:**
    - 1 ˚F increase 10 b/m of heart and pulse rate
    - 1 ˚C increase 15 b/m of heart and pulse rate
8. **Blood volume.**

    Excessive blood loss causes the heart and pulse rates to increase
9. **Drugs**

- **Pulse Rhythm:** (pattern of the pulsation and the pauses between them).

  Arrhythmia or dysrhythmia (irregular pattern of heart beats).
- **Pulse volume**: quality of pulsations that are felt.
- **Identifying pulse volume**

Absent pulse: No pulsation is felt despite extreme pressure

Thready pulse: Pulsation is not easily felt; slight pressure causes it to disappear.

Weak pulse: Pulse is stronger than thready; light pressure causes it to disappear

Normal pulse: Pulsation is felt easily; moderate pressure causes it to disappear.

Bounding pulse: Pulsation is strong end does not disappear with moderate pressure

Pulse Assessment Techniques

- **Primary pulse assessment site**:
  - Radial artery located at inner (thumb) side of the wrist
- **Apical – radial rate:**
  - Number of sounds heard at heart's apex and the rate of radial pulse during the same period.
- **The pulse deficit**:
  - Difference between the apical and radial pulse rate

Peripheral Pulse Sites

- Temporal.
- Radial
- Carotid.
- Femoral.
- Brachial.
- Posterior tibial.
- Dorsalis pedis
- Popliteal.
- Apical

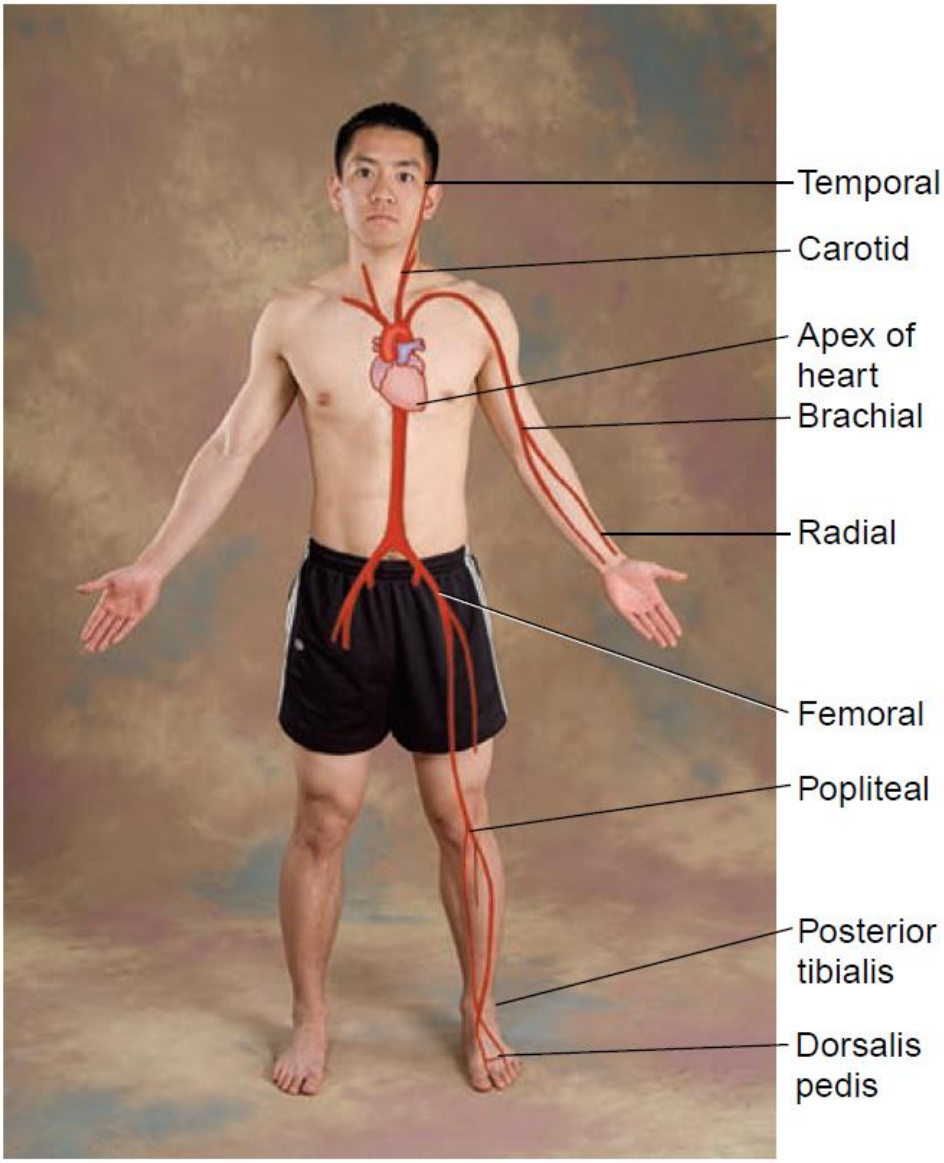


FIGURE 12-12 The peripheral pulse sites.

- .

Respiration

- **Respiration :** Exchange of oxygen and carbon dioxide
    1. **External respiration**: "When respiration occurs between the alveolar wall and capillary's membrane."
    2. **Internal respiration** "When respiration occurs between the blood and body cells"
- **Ventilation**:" Movement of air in and out of chest involving inspiration and expiration“

Respiratory rate: “Number of ventilations per minute“

The ratio of one respiration to approximately four or five heartbeats is fairly consistent in healthy adults.

Tachypnea (Rapid Respiratory Rate)

Accompanies elevated temperature or diseases affecting cardiac and respiratory systems

Bradypnea (Slower than normal respiratory rate at rest)

can result from medications; observed in clients with neurologic disorders or hypothermia

TABLE 12-7 Normal Respiratory Rates at Various Ages

AGE	AVERAGE RANGE
Newborn	30–80
Early childhood	20–40
Late childhood	15–25
Adulthood	
Men	14–18
Women	16–20

Abnormal Breathing Characteristics

1. **Hyperventilation**: “Rapid or deep breathing or both).
2. **Hypoventilation:**" Diminished breathing".
3. **Dyspnea:**" Difficult or labored breathing".
4. **Orthopnea:** “Breathing that facilitated by sitting or standing position". (difficult breathing in sleeping position)
5. **Apnea:** “Absence of breathing ".
6. **Stertorous breathing:"** noisy ventilation"
7. **Stridor:** “Harsh, high pitched sound heard or inspiration where there is laryngeal obstruction.
8. **Cheyne-Stokes respiration**: a breathing pattern in which the depth of respirations gradually increases, followed by a gradual decrease, and then a period when breathing stops briefly before resuming again

Blood Pressure

- Force that the blood exerts within the arteries
- **Circulating blood volume:** which averages 4.5 to 5.5 liters in adult women and 5.0 to 6.0 liters in adult men
    - Lower-than-normal volumes of circulating blood cause a decrease in blood pressure
    - Excess volumes cause an increase in blood pressure
- Regular aerobic exercise increases tone of heart muscle and increases efficiency
- **Cardiac output (**volume of blood ejected from the left ventricle per minute) is approximately 5 to 6 L in adults at rest
- Blood pressure measurements provide physiologic data about:
    - Ability of arteries to stretch

- Volume of circulating blood
- Amount of resistance heart must overcome when it pumps blood

- **Contractility of the heart**: "is related to preload (volume of blood that fills the heart and stretches the heart muscle fiber during it's resting phase).
- **Peripheral resistance:** (after load) force against which the heart pumps when ejecting blood.
- **Cardiac output per minute** = heart rate per minute multiply by stock volume
- **NB** :(stock volume: amount of blood in the ventricle before ejected and it is about 70 ml of blood).
- **So** , cardiac output per minute = H R / m X stoke volume (70)

Factors Affecting Blood Pressure

Age: increase age leads to increase BP due to atherosclerosis.

Circadian rhythm: lowest after midnight, begins rising at approximately 4 or 5 AM. and peaks during late morning or early afternoon.

Gender: women tend to have lower BP than men of the same age.

Exercise and activity: BP raised during exercise and activity.

Emotions and pain: strong emotion tends to raise BP.

Lower blood pressure

Lower when lying down than when sitting or standing

Higher blood pressure

When urinary bladder is full, when the legs are crossed, when the person is cold

When drugs that stimulate the heart are taken

Pressure Measurements

- **Systolic pressure**: (pressure within the arterial system when the heart contracts)
- **Diastolic pressure:** (pressure when the heart relaxes and fills with blood).
- Blood pressure is expressed in millimeters of mercury (mm Hg) as a fraction; systolic pressure/diastolic pressure
- **Pulse pressure:** difference between systolic and diastolic blood pressure measurements

Assessment Sites

- Usually assessed over the brachial artery at the inner aspect of the elbow
- Lower arm and radial artery
- Measured over the popliteal artery behind the knee in case:
    - Client's arms are missing
    - Both of a client's breasts have been removed
    - Client has had vascular surgery

Equipment for Measuring Blood Pressure

- Sphygmomanometer: may be portable or wall mounted.
- Aneroid manometer
- Electronic Oscillometric manometer
- Inflatable cuff
- Stethoscope

Korotkoff sound:

(Sound that result from the vibrations of blood within the arterial wall or changes in blood flow).

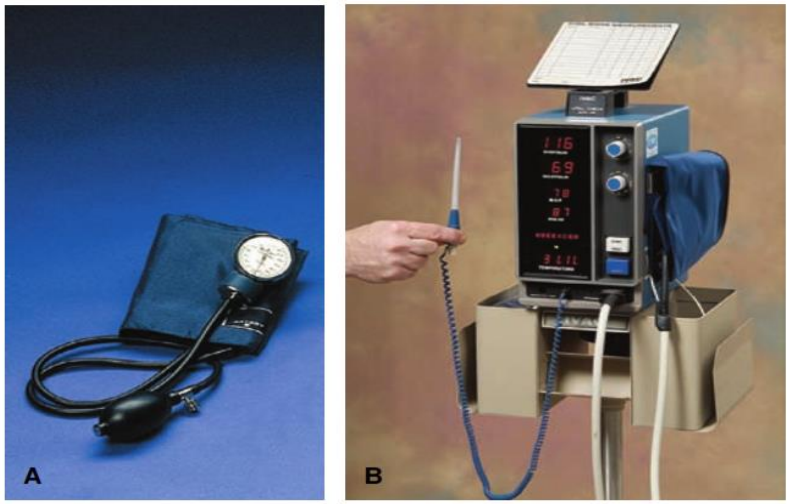


FIGURE 12-17 An aneroid (**A**) and an electronic oscillometric manometer (**B**).

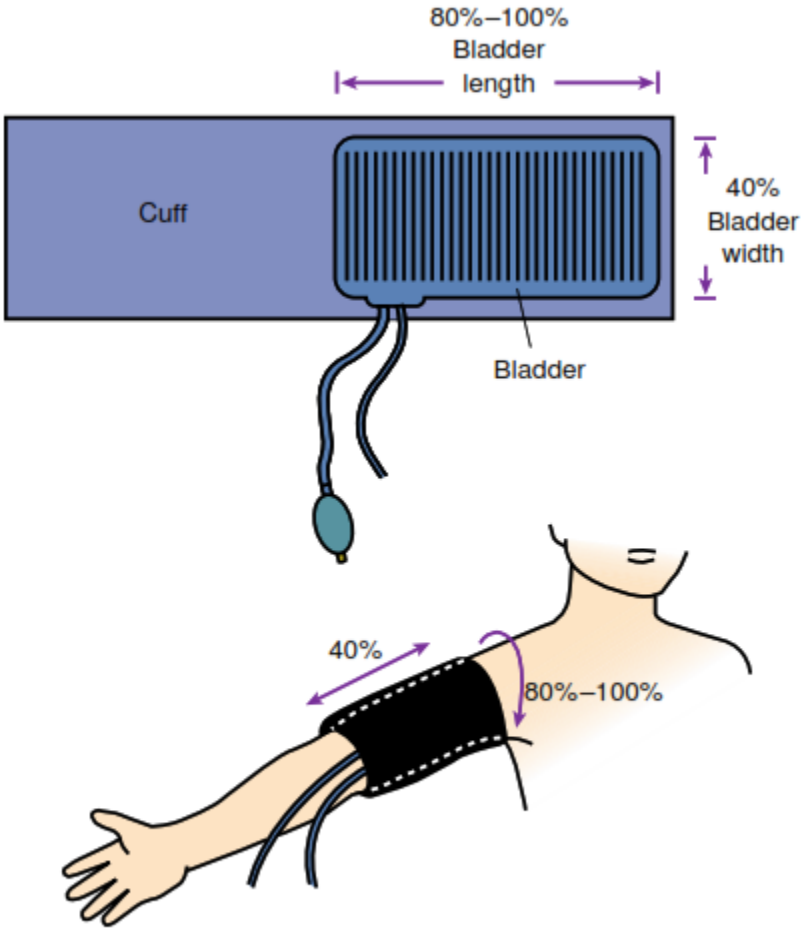


FIGURE 12-18 To determine the appropriate size of blood pressure cuff, the width of the bladder should be 40% of the midarm circumference and the length should be at least 80%.

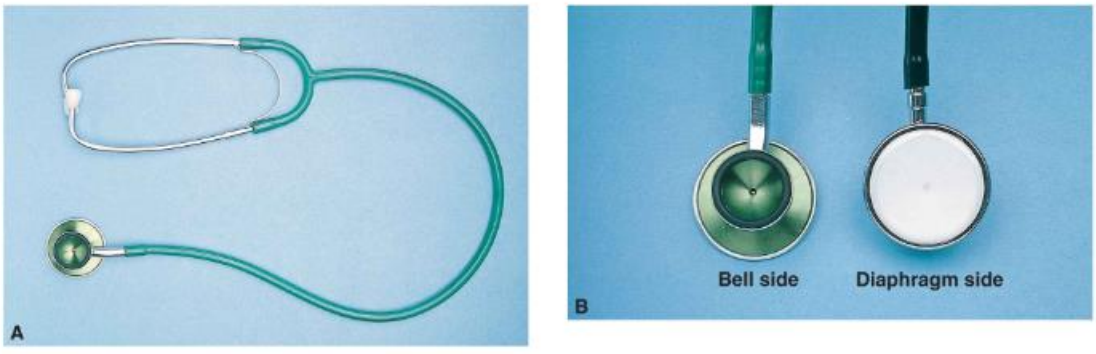
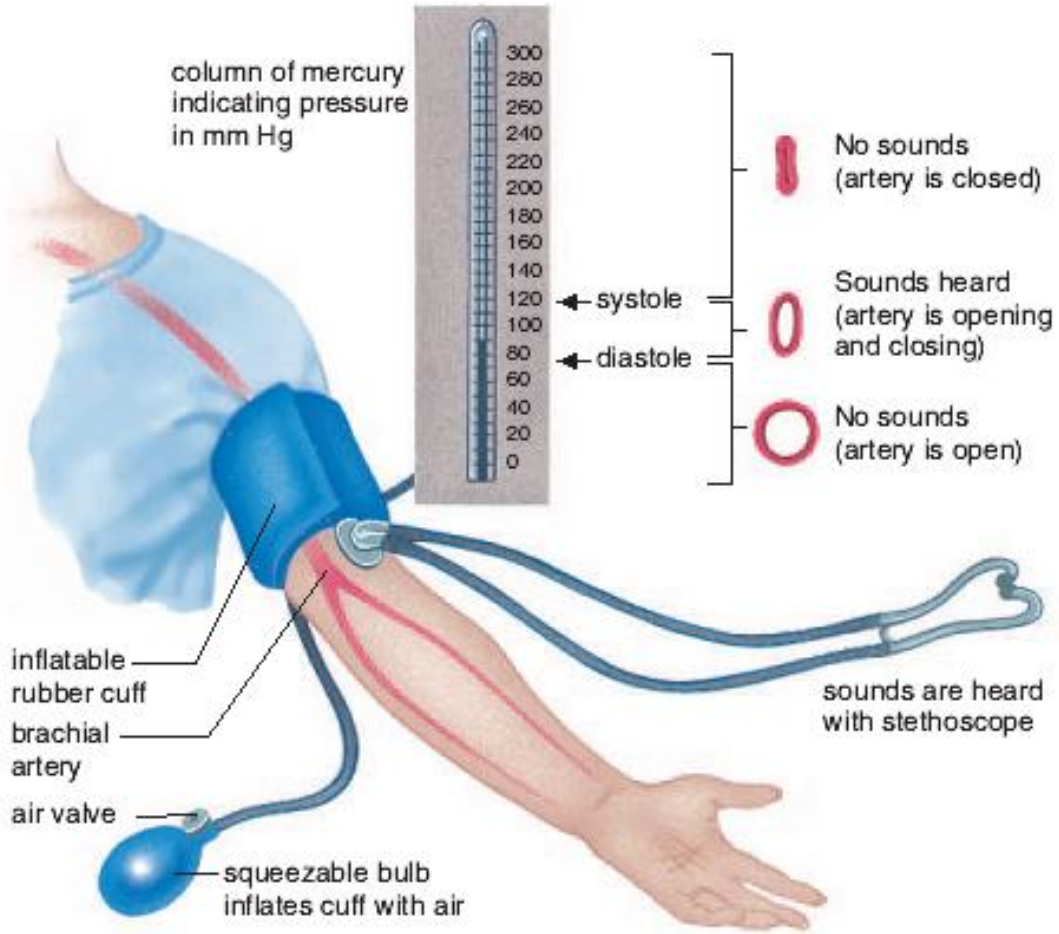


FIGURE 12-22 A stethoscope **(A)** and a chest piece **(B)**.

Measuring Blood Pressure

- Phase I: first faint but clear tapping sound that follows a period of silence as pressure is released from the cuff
- Phase II: change from tapping sounds to swishing sounds
- Phase III: change to loud and distinct sounds—crisp knocking sounds
- Phase IV: sounds muffled and has a blowing quality—first diastolic pressure measurement
- Phase V: point at which the last sound is heard—second diastolic pressure measurement



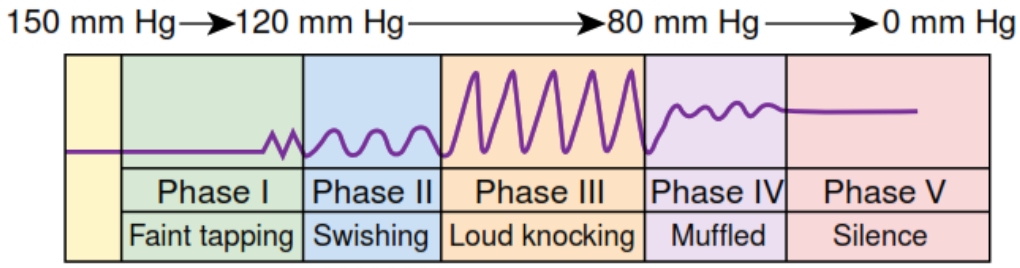


FIGURE 12-20 Characteristics of Korotkoff sounds.

TABLE 12-9 Common Causes of Blood Pressure Assessment Errors

CAUSE	EFFECT	CORRECTION
Inaccurate manometer calibration	False high or low readings	Recalibrate, repair, or replace gauge
Loosely applied cuff	High reading	Wrap snugly with equal pressure about extremity
Cuff too small for extremity	High reading	Select appropriate size
Cuff too large for extremity	Low reading	Select appropriate size
Cuff applied over clothing	Creates noise or interferes with sound perception	Remove arm from sleeve or have client don a gown
Tubing that leaks	Rapid loss of pressure	Replace or repair
Improper positioning of eartips	Poor sound conduction	Reposition and retake blood pressure
Impaired hearing	Altered sound perception	Use an alternative assessment technique or equipment
Loud environmental noise	Interferes with sound perception	Reduce noise and reassess
Impaired vision	Inaccurate observation of gauge	Correct vision; reposition gauge in adequate range
Rapid cuff deflation	Inaccurate observation of gauge	Reassess and deflate at 2 to 3 mm Hg/second
Number bias	Falsely high or low measurements	Use an electronic sphygmomanometer

TABLE 12-10 Classification of Adult Blood Pressure Measurements

CATEGORY	SYSTOLIC (MM HG)		DIASTOLIC (MM HG)
Normal[a]	<120	and	<80
Prehypertension	120–139	or	80–89
Hypertension[b]			
Stage 1	140–159	or	90–99
Stage 2	160 or higher	or	100 or higher

[a]Normal blood pressure with respect to cardiovascular risk is below 120/80 mm Hg. However, unusually low readings should be evaluated for clinical significance.

[b]Based on the average or two or more readings taken at each of two or more visits after an initial screening.

Classification terms and measurements from the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, 2004.

Abnormal Blood Pressure Measurements

- Blood pressures above or below normal ranges indicate significant health problems
- **Hypertension** or high blood pressure is associated with:
    - Anxiety
    - Obesity
    - Vascular diseases
    - Stroke, heart failure
    - Kidney diseases
- **Hypotension**: low blood pressure
- **Postural or orthostatic hypotension**: sudden but temporary drop in blood pressure when rising from a reclining position

Documenting Vital Signs

- Once vital sign measurements are obtained:
    - Document the data in medical record for analysis of patterns and trends
    - Enter the data, along with any other subjective or objective information in narrative nursing notes

Nursing Implications

- Vital sign assessment is the basis for identifying problems
- Nurses identify from the nursing diagnoses:
    - Hyperthermia, hypothermia, ineffective thermoregulation, decreased cardiac output, risk for injury, or ineffective breathing pattern

Chapter 3
Therapeutic Exercise

Learning Objectives

On completion of this chapter, the students should be able to:

1. List at least five benefits of regular exercise.
2. Define fitness.
3. Identify seven factors that interfere with fitness.
4. Name at least two methods of fitness testing.
5. Describe how to calculate a person's target heart rate.
6. Define metabolic energy equivalent.
7. Differentiate fitness exercise from therapeutic exercise.
8. Differentiate isotonic exercise from isometric exercise.
9. Give at least one example of isotonic and isometric exercises.
10. Differentiate between active exercise and passive exercise.
11. Discuss how and why range-of-motion exercises are performed.
12. Provide at least two suggestions for helping older adults become or stay physically active.

Exercise (purposeful physical activity)

Is beneficial to people of all age groups, and the health risks of a sedentary lifestyle are well documented.

Box 24-1 • Benefits of Physical Exercise

- Improved cardiopulmonary function
- Reduced blood pressure
- Increased muscle tone and strength
- Greater physical endurance
- Increased lean mass and weight loss
- Reduced blood glucose level
- Decreased low-density blood lipids
- Improved physical appearance
- Increased bone density
- Regularity of bowel elimination
- Promotion of sleep
- Reduced tension and depression

Fitness Assessment

- **Fitness** means capacity to exercise. Factors such as a sedentary lifestyle, health problems, compromised muscle and skeletal function, obesity, advanced age, smoking, and high blood pressure can impair a client's fitness and stamina.

Body Composition

- **Body composition** is the amount of body tissue that is lean versus the amount that is fat. Determining factors include anthropometric measurements such as height, weight, body-mass index, skinfold thickness, and midarm muscle circumference.
- Inactivity without reduced food intake tends to promote obesity.

Vital Signs

- Vital signs—temperature, pulse rate, respiratory rate, and blood pressure—reflect a person's physical status.

Fitness Tests

- Fitness tests provide an objective measure of a person's current fitness level and potential for safe exercise.

- Two methods of fitness testing are a stress electrocardiogram and an ambulatory electrocardiogram. Another is a **submaximal fitness test**, which is an exercise test that does not stress a person to exhaustion. Examples of submaximal fitness tests include a walk-a-mile test.

Stress Electrocardiogram

- A **stress electrocardiogram** tests electrical conduction through the heart during maximal activity and is performed in an acute care facility or outpatient clinic.

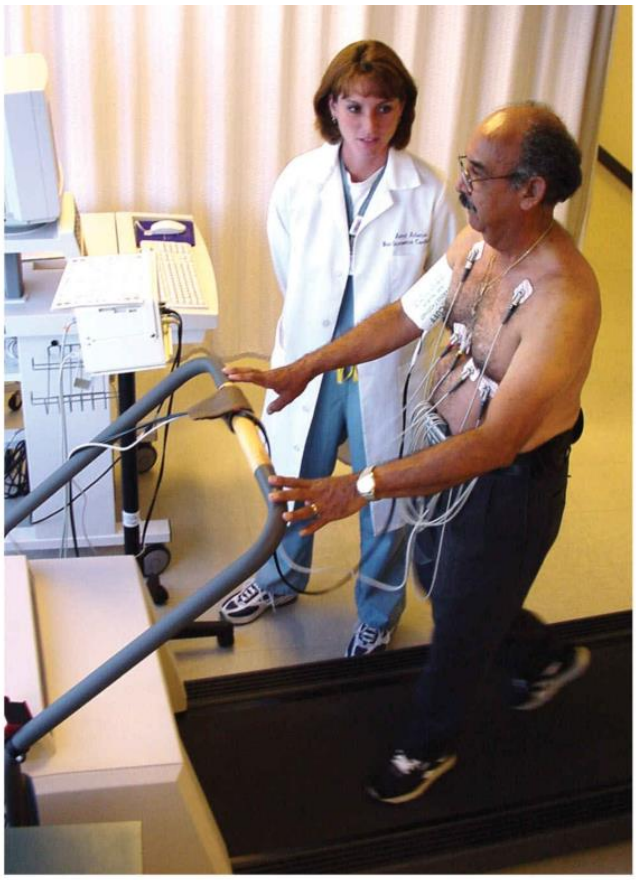


FIGURE 24-1 A stress electrocardiogram test. (Image Texas Heart Institute, www.texasheart.org)

An ambulatory electrocardiogram

Is a continuous recording of heart rate and rhythm during normal activity.

It requires the client to wear a device called a Holter monitor for 24 hours.

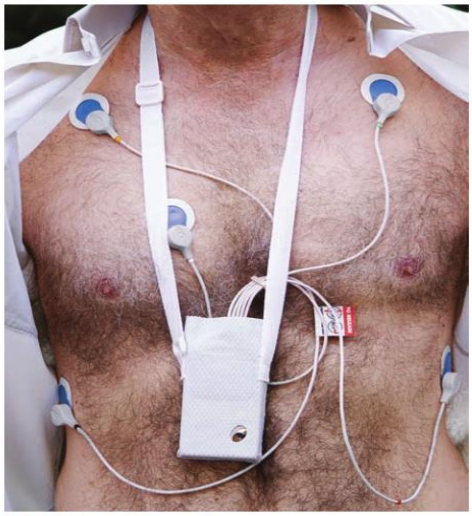


FIGURE 24-2 Ambulatory electrocardiography.

Walk-a-Mile Test

- The **walk-a-mile test**, measures the time it takes a person to walk 1 mile. The person is instructed to walk 1 mile on a flat surface as fast as possible. The examiner calculates the time from start to finish and interprets results using the guidelines in table.

TABLE 24-2 Evaluation Criteria for the Walk-a-Mile Test

PERFORMANCE TIME FOR MEN (MIN)	PERFORMANCE TIME FOR WOMEN (min)	FITNESS LEVEL*
≥15:3	≥17:3	Poor
14:01–14:42	15:07–16:06	Average
12:54–14:00	14:12–15:06	Good
<12:54	<14:12	Excellent

*Based on adults age 40–49.

Exercise Prescriptions

- The prescription for an exercise program involves determining the person's target heart rate
- **Target heart rate** means the goal for heart rate during exercise. It is determined by first calculating the person's **maximum heart rate** (highest limit for heart rate during exercise). Maximum heart rate is calculated by subtracting a person's age from 220.
- The target heart rate is 60% to 90% of the maximum heart rate.
- Beginners should not exceed 60%, intermediates can exercise at 70% to 75%, and competitive athletes can tolerate 80% to 90% of their maximum heart rate.
- Exercising at the target rate for 15 minutes (excluding the warm-up and cool-down periods) three or more times per week strengthens the heart muscle and promotes the use of fat reserves for energy. Exercising beyond the target heart rate reduces endurance by increasing fatigue.

Types of Exercise

- The two major types of exercise are:
  - Fitness exercise

- Therapeutic exercise.

1. Fitness Exercise

- **Fitness exercise** means physical activity performed by healthy adults. Fitness exercise develops and maintains cardiorespiratory function, muscular strength, and endurance. The two categories of fitness exercise are
  - Isotonic.
  - Isometric.

FIGURE 24-3 Stationary cycling.

- **Isotonic exercise** is activity that involves movement and work. The example is **aerobic exercise**, which involves rhythmically moving all parts of the body at a moderate to slow speed without hindering the ability to breathe. In other words, the person can talk comfortably if the exercise is within his or her level of fitness.

- **Isometric exercise** consists of stationary exercises generally performed against a resistive force.

- Examples include body building, weight lifting, and less intense activities such as simply contracting and relaxing muscle groups while sitting or standing.

2. Therapeutic Exercise

- **Therapeutic exercise** is activity performed by people with health risks or being treated for an existing health problem. Clients perform therapeutic exercise to prevent health-related complications or to restore lost functions

Active Exercise

- **Active exercise** is therapeutic activity that the client performs independently after proper instruction.
- For example, clients who have undergone a mastectomy learn to exercise the arm on the surgical side

Passive Exercise

- **Passive exercise** is therapeutic activity that the client performs with assistance and is provided when a client cannot move one or more parts of the body.
- For example, for clients who are comatose or paralyzed from a stroke or spinal injury.

Range-of-Motion Exercises

Range-of-motion (ROM) **exercises** are therapeutic activities that move the joints. They are performed for the following reasons:

- To assess joint flexibility before initiating an exercise program
- To maintain joint mobility and flexibility in inactive clients
- To prevent **ankylosis** (permanent loss of joint movement)
- To stretch joints before performing more strenuous activities
- To evaluate the client's response to a therapeutic exercise program

- During ROM exercises, the client moves or is assisted to move unused joints in the positions that the joint normally permits (Table 24-4). Whenever possible, the client actively exercises as many joints as possible while the nurse assists with those that are compromised. See Nursing Guidelines 24-1.

Client and Family Teaching 24-1 A Safe Exercise Program

The nurse teaches the client and the family as follows:

- Seek a pre-exercise fitness evaluation from a health care provider or a certified sports trainer.
- Determine the target heart rate according to fitness level.
- Determine the appropriate level of METs.
- Choose a form of exercise that seems pleasurable and involves as many muscle groups as possible.
- Plan at least 150 minutes of moderate-intensity exercise per week that can be divided in no less than 10 minutes or longer over multiple days to achieve target amount (American College of Sports Medicine, 2011).
- Build up to 30 minutes or more of moderate-intensity physical activity on most (preferably all) days of the week to prevent cardiovascular disease (Douglas, 2014).
- Exercise with a partner for safety and motivation.
- Avoid exercising in extreme weather conditions (high humidity, smog).
- Dress in layers according to the temperature and weather conditions.
- Wear supportive shoes.
- Wear reflective clothing after dark.
- Walk or jog against traffic; cycle in the same direction as traffic.
- Eat complex carbohydrates (pasta, rice, cooked cereal) rather than fasting or eating simple sugars (cookies, chocolate, sweetened drinks) before exercising.
- Avoid drinking alcohol, which dilates the blood vessels, promotes heat loss, and interferes with good judgment.
- Warm up for 5 minutes by stretching muscle groups or doing light calisthenics.
- Measure the heart rate two or three times while exercising.
- Slow down if the heart rate exceeds the preestablished target.
- Try to sustain the target heart rate for at least 12 to 15 minutes.
- Never stop exercising abruptly.
- Cool down for at least 5 minutes in a manner similar to the warm-up.

Nursing Implications

- Impaired Physical Mobility
- Risk for Disuse Syndrome
- Unilateral Neglect
- Risk for Delayed Surgical Recovery
- Activity Intolerance

Chapter 4
Ambulatory Aids

Learning Objectives

On completion of this chapter, the students should be able to:

1. Name four activities that prepare clients for ambulation.
2. Give two examples of isometric exercises that tone and strengthen lower extremities.
3. Identify one technique for building upper arm strength.
4. Explain the reason for dangling clients or using a tilt table.
5. Name two devices used to assist clients with ambulation.
6. Give three examples of ambulatory aids.
7 . Identify the most stable type of ambulatory aid.
8. Describe three characteristics of appropriately fitted crutches.
9. Name four types of crutch-walking gaits.
10. Explain the purpose of a temporary prosthetic limb.
11. Discuss two criteria that must be met before constructing a permanent prosthetic limb.
12. Name four components of above-the-knee and below-the knee prosthetic limbs.
13. Describe how a prosthetic limb is applied.
14. Discuss age-related changes that affect the gait and ambulation of older adults.

Ambulatory Aids

Preparing for Ambulation

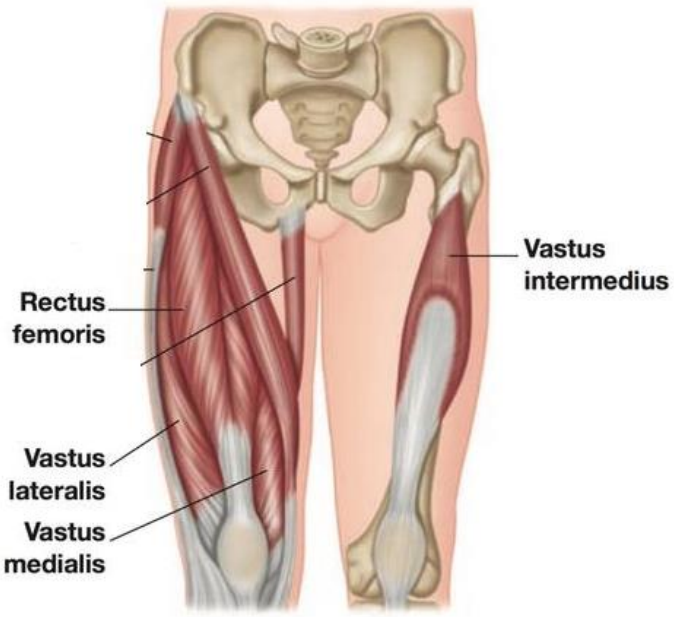
- Debilitated clients (those who are weak from prolonged inactivity) require physical conditioning before they can ambulate again
  - Disorders of musculoskeletal system
  - Injuries to musculoskeletal system
  - Weak or unsteady because of age-related or neurologic problems.

Some techniques for increasing muscular strength and the ability to bear weight include:

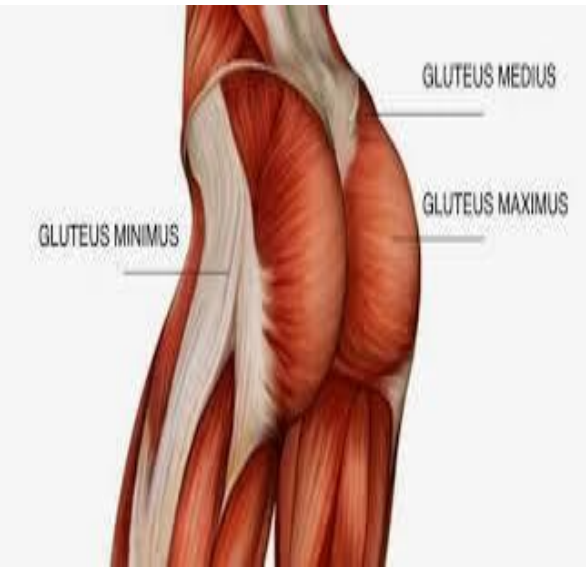
1. Performing isometric exercises with lower limbs
2. Performing isotonic exercises with upper arms
3. Dangling at the bedside
4. Using a device called a tilt table

- **Isometric exercises**: used to promote muscle tone and strength
- **Tone**: the ability of muscles to respond when stimulated
- **Strength**: the power to perform
- Both tone and strength are essential in maintaining mobility
- Frequent contraction of muscle fibers retains or improves muscle tone and strength
- Active people maintain this through everyday activities, but inactive people and those who have been immobilized in casts or traction may require focused periods of exercise to reestablish their previous ability to walk
- **Isometric exercises:**
  - **Quadriceps setting:** client alternately tenses and relaxes the quadriceps muscles
  - **Gluteal setting:** client contracts and relaxes the gluteal muscles to strengthen and tone them

- The **quadriceps muscles** (rectus femoris, vastus intermedius, vastus medialis, vastus lateralis) **cover the front and side of the thigh**
  - aid in extending the leg
  - exercising these muscles enables clients stand and support their weight



- The **gluteal muscles** (gluteus maximus, gluteus medius, gluteus minimus) are the **muscles in the buttocks**
  - Aid in extending, abducting and rotating the leg – functions essential for walking



  - Both of the isometric exercises, quadriceps setting and gluteal setting, can easily be done in bed or in a chair

- These exercises are initiated long before the anticipated time when ambulation will start
- Most clients can perform these exercises independently once they have been instructed

Client and Family Teaching 26-1
Quadriceps and Gluteal Setting Exercises

The nurse teaches the client and the family as follows:

- Tighten (contract) the quadriceps muscles by flattening the backs of the knees into the mattress. If that is not possible, place a rolled towel under the knee or heel before attempting to tighten the quadriceps muscles.
- Check to see that the kneecaps move upward. This is an indication that the client is performing the exercise correctly.
- Hold the contracted position for a count of five.
- Relax and repeat two or three times each hour.
- Tighten (contract) the gluteal muscles by pinching the cheeks of the buttocks together.
- Hold the contracted position for a count of five.
- Relax and repeat two or three times each hour.

Upper Arm Strengthening

- Clients who will use a walker, cane or crutches need upper arm strength
  - Upper arm strengthening includes:
    - flexion and extension of the arms and wrists
    - raising and lowering weights with the hands
    - squeezing a ball or spring grip
    - modified hand push-ups in bed Q-1
- **Modified push-ups**: clients support their upper body on the arms
  - While sitting in bed, client lifts the hips off the bed by pushing done on the mattress with the hands
  - If mattress is soft, nurse places a block or books on the bed under the client's hands
  - In sturdy armchair, client can raise body from the seat while pushing on the

armrests

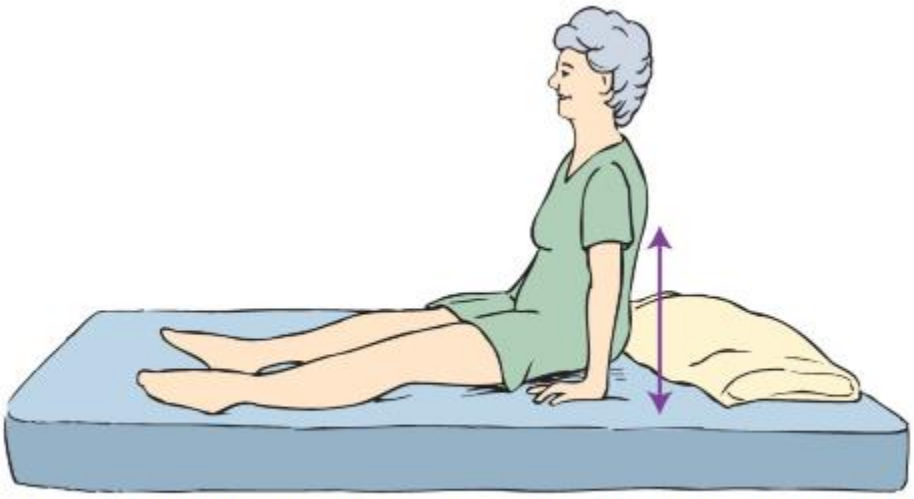


FIGURE 26-1 Modified hand push-ups are performed by extending the elbows and flexing the wrists to lift the buttocks slightly off the mattress.

Dangling: sitting on the edge of bed dangling the feet

- Helps to normalize BP, which may drop as the client rises from a reclining position (postural hypotension)

FIGURE 26-2 Dangling. (Copyright B. Proud.)

Tilt Table

- **Tilt table**: device that raises the client from a supine to a standing position
- Helps client adjust to upright and bearing weight on their feet

Tilt Table is normally in the physical therapy dept., nurses prepare the client for this type of pre-ambulation therapy

FIGURE 26-3 A tilt table.

Preparing for Tilt Table Therapy

- Just before using a tilt table, the nurse applied **TED hose**
  - Used to compress vein walls, preventing pooling of blood in the extremities, which may trigger fainting
  - After transfer from bed/stretcher to tilt table, client is strapped in to prevent falling
  - Feet are positioned against the foot rest

Tilt Table Therapy

  - With client strapped in the entire table is tilted in increments of 15 to 30 degrees

until the client is in a vertical position

- If dizziness or hypotension occurs, the table is lowered or returned to the horizontal position

- **Assistive Devices**
  - Devices to support and assist in walking:
  - **Parallel bars** (handrails) provide practice in ambulating

FIGURE 26-6 Parallel bars.

  - **Walking belt** applied around client's waist provides secure grip to prevent injury while ambulating if client loses balance

FIGURE 26-5 Using a walking belt.

Assisting a client to ambulate, the nurse walks alongside holding the gait belt or the client's own belt & supporting the arm

Assistive Devices

- A walking or gait belt can be used to assist an older person with transferring, even if the client is not ambulatory. The older client balances on the stronger extremity while being supported with the gait belt. The client should never be forced to walk if unable
- While ambulating, the nurse observes the client for pallor, weakness or dizziness.

Ambulating a client using a gait belt:

If fainting seems likely:

- the nurse supports the client by sliding an arm under the axilla and placing a foot to the side, forming a wide base of support.
- With the client's weight braced, the nurse balances the client on the hip until help arrives or slides the client down the length of the nurse's leg to the floor.

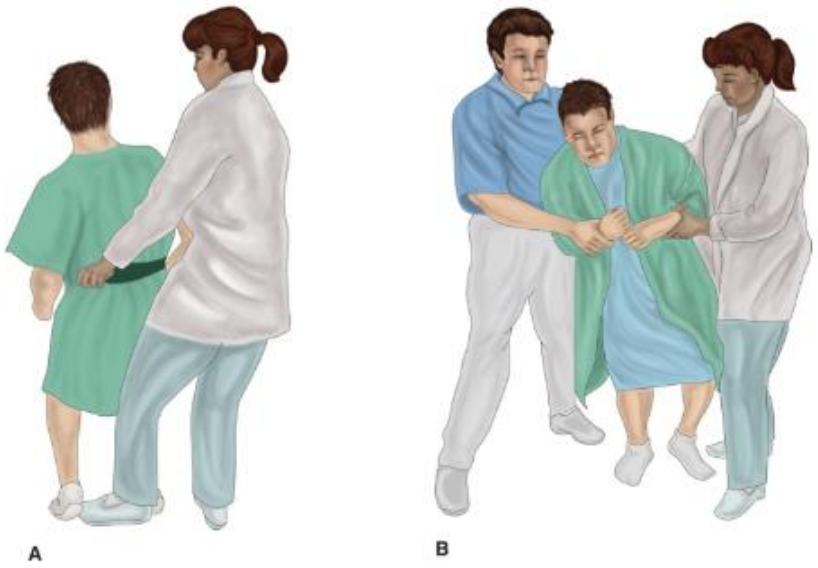


FIGURE 26-7 **(A)** One nurse guides a client to the floor. **(B)** A client is lowered to the floor with two nurses. [From Taylor, C., Lillis, C., LeMone, P., et al. [2015]. *Fundamentals of nursing* [8th ed. p. 1076]. Philadelphia, PA: Lippincott Williams & Wilkins.)

Ambulatory Aids

- **Crutches**: generally used in pairs and made of wood or aluminum
  - **Axillary** (standard): used for brief, temporary assistance
  - **Forearm** (have an arm cuff, no axillary bar): used by experienced clients needing permanent assistance
  - **Platform** (support the forearm): used for clients who cannot bear weight with their hands and wrists. Many clients with arthritis use them.

Sometimes clients use one axillary crutch and one platform crutch – when one arm is broken

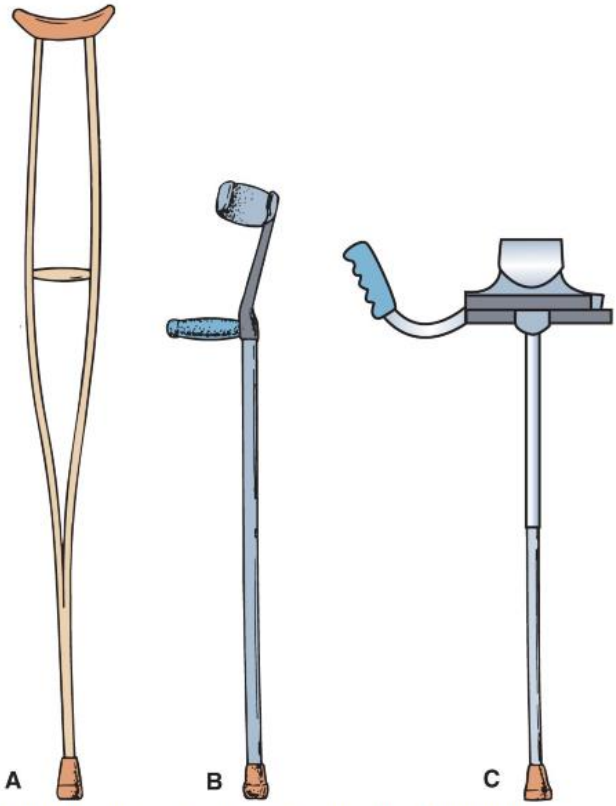


FIGURE 26-11 Three types of crutches: axillary (**A**), forearm (**B**), and platform (**C**).

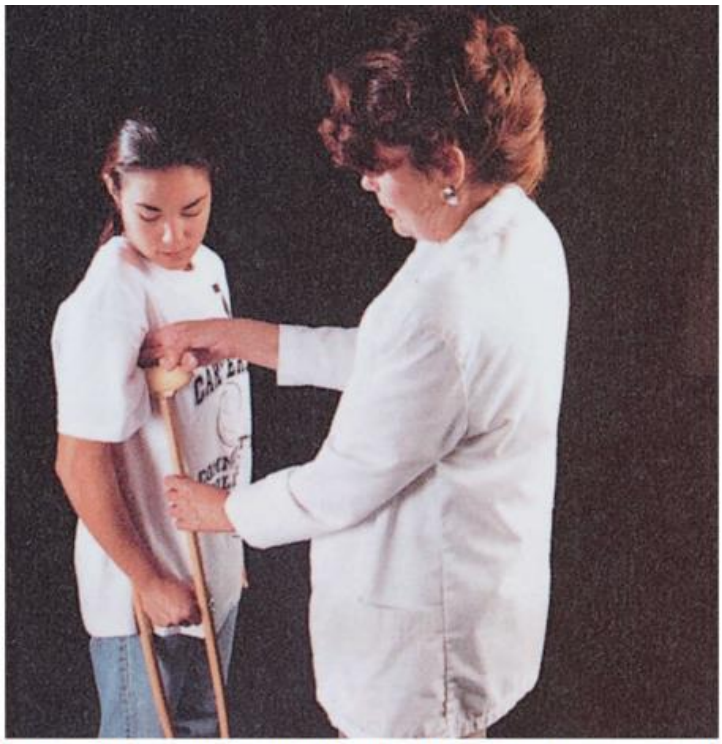


FIGURE 26-12 There must be room for two fingers between the axilla and the crutch bar to prevent nerve damage. (Hinkle, J. L., & Cheever, J. H. [2014]. *Brunner & Suddarth's Textbook of medical-surgical nursing* [13th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins.)

- **Cane**: a hand-held ambulation device made of wood or aluminum
  - Rubber tips reduce possibility of slipping
- Used for clients who have weakness on one side of the body

Types of canes:

- **Half-circle handle**: for clients who need minimal support
- **T-Handle**: has handgrip with slightly bent shaft, offering more stability
- **Quad**: has 4 supports at the base & provides more stability than the other types

FIGURE 26-8 Three types of canes: **(A)** Standard cane; **(B)** Functional cane; **(C)** Quad cane. (From Kronenberger, J. & Woodson, D. [2012]. *Lippincott Williams & Wilkins' clinical medical assisting* [4th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins [PE].)

FIGURE 26-7 A quad cane. Note that the handle is parallel to the client's hip. (Photo by B. Proud.)

Cane must be the right height for the client:

- Handle should be parallel with the client's hip, providing an elbow flexion of approximately 30 degrees
- Removing a portion of the lower end can shorten wooden canes
- Depressing metal buttons in the telescoping shaft can shorten/lengthen aluminum canes

When clients are beginning to use a cane, the nurse assists by applying a walking/gait belt

and standing toward the back of the client's stronger side.

Client and Family Teaching 26-2 Using a Cane

The nurse teaches the client and the family as follows:

- Place the cane on the stronger side of the body.
- Stand upright with the cane 4 to 6 inches (10 to 15 cm) to the side of the toes
- Move the cane forward at the same time as the weaker extremity.
- Take the next step with the stronger extremity.
- When using stairs:
  - Use a stair rail rather than the cane when going up or down stairs, if possible
  - Take each step up with the stronger leg followed by the weaker one. Reverse the pattern for descending the stairs.
  - If there is no stair rail, advance the cane just before rising or descending with the weaker leg.
- When sitting:
  - Back up to the chair until the seat is against the back of the legs
  - Rest the cane close by.
  - Grip the arm rests with both hands.
  - Sit down.
- When getting up from a chair:
  - Grip the arm rest while holding the cane in the stronger hand.
  - Advance the stronger leg.
  - Lean forward.
  - Push with both arms against the arm rests.
  - Stand until balanced and any symptoms of dizziness pass.

- **Walker**: ***most stable*** form of ambulatory device; has curved aluminum bars and three-sided enclosure with four legs for support
- Some have front wheels
- Other adaptations are made for clients who have compromised use of one or both arms or those who must use stairs
- Height of the walker is adjustable

Nurses instruct clients who use a walker to:

- Stand within the walker
- Hold on to the walker at the padded handgrips
- Pick up the walker & advance it 6 to 8 inches

- Take a step forward
- Support the body weight on the handgrips when moving the weaker leg (for clients with partial or non-weight-bearing on one leg)

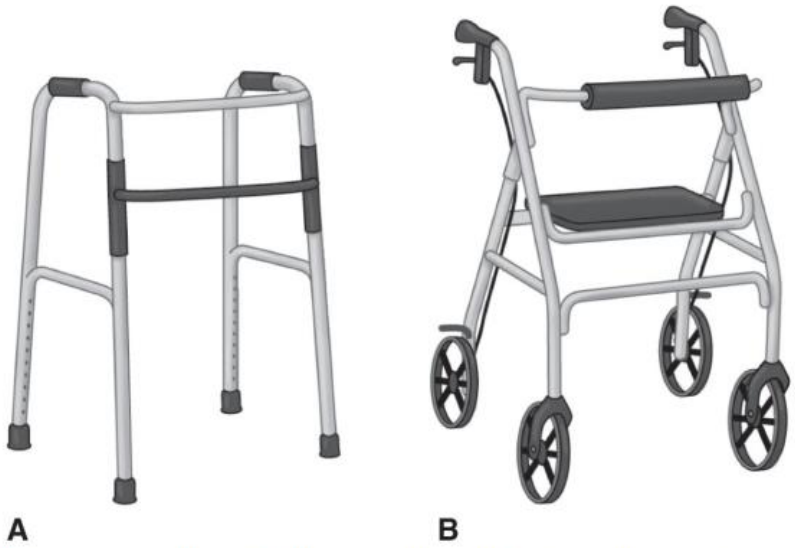


FIGURE 26-10 Two types of walkers: **(A)** Pick-up walker; **(B)** Rolling walker on wheels.

- Older adults sometimes use a 'step-stop' pattern when using an ambulatory aid. Encourage a smooth, progressive cadence.
- Some develop the habit of picking up & carrying a walker rather than having it make contact with the floor. The person may benefit from a walker with wheels. Physical therapy can assess this & recommend an appropriate walker.
- Rubber tips & handgrips on ambulatory aids should be kept clean & replaced when worn. Worn or dirty tips & handgrips contribute to falls & unsafe mobility
- Home use of canes/walkers: advise family to make home safer by removing scatter rugs, ensuring adequate lighting, no electric cords are within pathways. Railings & grab bars installed in bathrooms & outside entrances
- Ramp with handrails helps when entering or leaving the home
- **Crutch-walking gaits**: pattern of walking when ambulating with crutches (page 567)
- **Point-the sum of the crutches and legs used when performing the gait**

1. **Four-point gait**

2. **Three-point gait**
3. **Two-point gait**
4. **Swing-through gait**

Measuring for Crutches, Canes, and Walkers

Once the type of ambulatory aid is medically prescribed, the client is measured.

Assisting With Crutch-Walking

- Remind the client to stand straight with the shoulders relaxed.
- Nurse stands to the side and slightly behind client on the weaker side.
- Take hold of the gait belt
- Instruct client to advance the crutches, lean forward, put some weight on the handgrips, move one or both feet, depending on the prescribed gait

Prosthetic Limbs

- **Temporary prosthetic limb**: immediate postoperative prosthesis (**IPOP**)
  - A temporary artificial limb consists of a walking pylon, a lightweight tube, attached to a shell made of plaster/plastic on the stump, and a rigid foot
  - A belt with garters keeps the prosthesis in place.

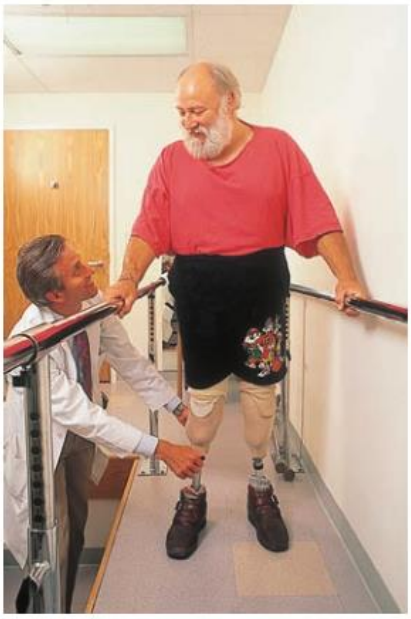


FIGURE 26-10 Many amputees receive prostheses soon after surgery and begin learning to use them with the support of the rehabilitation team.

Prosthetic Limbs

- Permanent prosthetic components delayed for several weeks or months to be sure:
  - **Incision has healed**
  - **Stump size is relatively stable**
  - Held in place by suction or by a leather belt, also called a sling
  - Custom-made to conform to stump and to meet client's needs

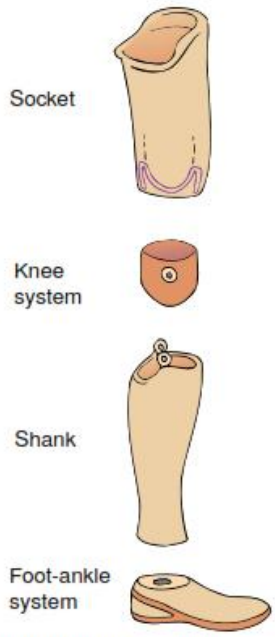


FIGURE 26-11 Components of a permanent prosthetic limb; a prosthesis for a BK amputation does not contain a knee system or a thigh socket.

- Prosthetic components include:
  - **Below the knee**: socket, shank, ankle/foot system
  - **Above the knee**: below-the-knee components plus a knee system
- Ambulation with a lower limb prosthesis requires strength and endurance

Nursing Implications

- Nursing diagnoses include:
  - Impaired physical mobility
  - Risk for disuse syndrome, trauma
  - Unilateral neglect
  - Risk for activity intolerance
  - Risk for peripheral neurovascular dysfunction

General Gerontologic Considerations

- Functional ability involves mobility and making adaptations to compensate for changes occurring with aging or disease processes
- May need encouragement and support integrating adaptations into their activities of daily living and maintaining their self-concept and body image
- Maintaining independence is important to older adults
- Mobility facilitates staying active and independent
- As a person ages, he or she may develop flexion of the spine which alters the center of gravity and may increase falls
- If client appears to have an unusual gait, assess the feet for corns, calluses, bunions, and ingrown/very long toenails.
- Vascular changes may lead to numbness and a decreased sensory ability to perceive contact with the ground, which can change a person's gait
- Ensure adequate lighting without laying electric cords in passageways
- Elevate toilet seats; install grab bars
- Rearrange home furnishings

Chapter 5

Wound Care

Learning Objectives

On completion of this chapter, the students should be able to:

1. Define the term wound.
2. Name three phases of wound repair.
3. Identify five signs and symptoms classically associated with the inflammatory response.
4. Discuss the purpose of phagocytosis, including the two types of cells involved.
5. Name three ways in which the integrity of a wound is restored.
6. Explain first-, second-, and third-intention healing.
7. Name two types of wounds.
8. State at least three purposes for using a dressing.
9. Explain the rationale for keeping wounds moist.
10. Describe two types of drains, including the purpose of each.
11. Name the two major methods for securing surgical wounds together until they heal.
12. Explain three reasons for using a bandage or binder.
13. Discuss the purpose for using one type of binder.
14. Give examples of four methods used to remove nonliving tissue from a wound.
15. List three commonly irrigated structures.
16. State two uses each for applying heat and for applying cold.
17. Identify at least four methods for applying heat and cold.
18. List at least five risk factors for developing pressure ulcers.
19. Discuss three techniques for preventing pressure ulcers.

Wound Care

- Body tissues have a remarkable ability to recover when injured. This chapter discusses several types of tissue injury, including those caused by surgical incisions and prolonged pressure. It also addresses nursing interventions to support the healing process and actions to prevent tissue injury.

Wounds

- A **wound** (damaged skin or soft tissue) results from **trauma** (general term referring to injury). Examples of tissue trauma include cuts, blows, poor circulation, strong chemicals, and excessive heat or cold. Such trauma produces two basic types of wounds: open and closed.

- An **open wound** is one in which the surface of the skin or mucous membrane is no longer intact.
- In a **closed wound**, there is no opening in the skin or mucous membrane. Closed wounds occur more often from blunt trauma or pressure.

TABLE 28-1 Types of Wounds

WOUND TYPES	DESCRIPTION
Open Wounds	
Incision	A clean separation of skin and tissue with smooth, even edges
Laceration	A separation of skin and tissue in which the edges are torn and irregular
Abrasion	A wound in which the surface layers of skin are scraped away
Avulsion	Stripping away of large areas of skin and underlying tissue, leaving cartilage and bone exposed
Ulceration	A shallow crater in which the skin or the mucous membrane is missing
Puncture	An opening of skin, underlying tissue, or mucous membrane caused by a narrow, sharp, pointed object
Closed Wounds	
Contusion	Injury to soft tissue underlying the skin from the force of contact with a hard object, sometimes called a bruise

Wound Repair

- The process of wound repair proceeds in three sequential phases: inflammation, proliferation, and remodeling.

Inflammation

- **Inflammation**, the physiologic defense immediately after tissue injury, lasts approximately 2 to 5 days. It's purposes are to
  - limit the local damage,
  - remove injured cells and debris, and
  - prepare the wound for healing.

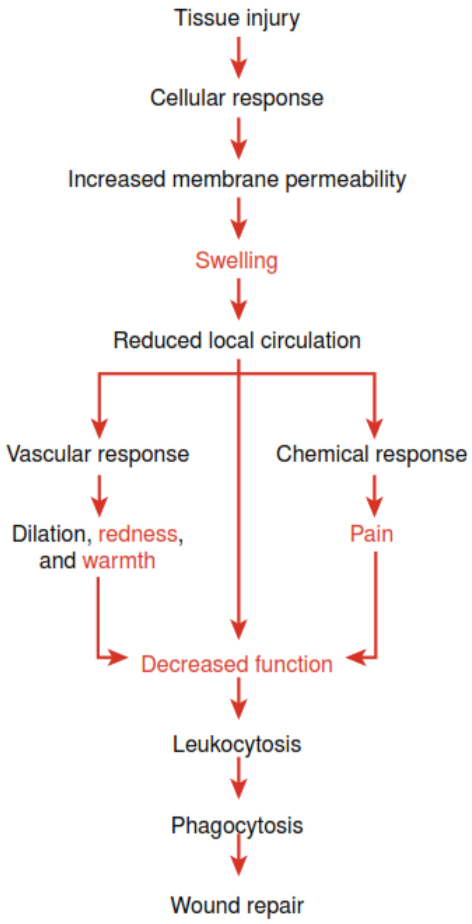


FIGURE 28-1 The inflammatory response. The words in red are the five classic signs and symptoms of inflammation.

Proliferation

- **Proliferation** (period during which new cells fill and seal a wound) occurs from 2 days to 3 weeks after the inflammatory phase. It is characterized by the appearance of **granulation tissue** (combination of new blood vessels, fibroblasts, and epithelial cells), which is bright pink to red because of the extensive projections of capillaries in the area.

Remodeling

- **Remodeling** (period during which the wound undergoes changes and maturation) follows the proliferative phase and may last 6 months to 2 years. During this time, the wound contracts, and the scar shrinks.

Wound Healing

- Several factors affect wound healing:
  - Type of wound injury
  - Expanse or depth of wound
  - Quality of circulation
  - Amount of wound debris
  - Presence of infection
  - Status of the client's health

Wound Healing Complications

- Factors that may interfere include compromised circulation; infection; purulent, bloody, or serous fluid accumulation that prevent skin and tissue approximation, and drugs like corticosteroids, and obesity.
- The nurse assesses the wound to determine whether it is intact or shows evidence of unusual swelling, redness, warmth, drainage, and increasing discomfort.

- Two potential surgical wound complications include **dehiscence** (separation of wound edges) and **evisceration** (wound separation with protrusion of organs) These complications are most likely within 7 to 10 days after surgery. They may be caused by insufficient dietary intake of protein and sources of vitamin C, premature removal of sutures or staples: unusual strain on the incision.

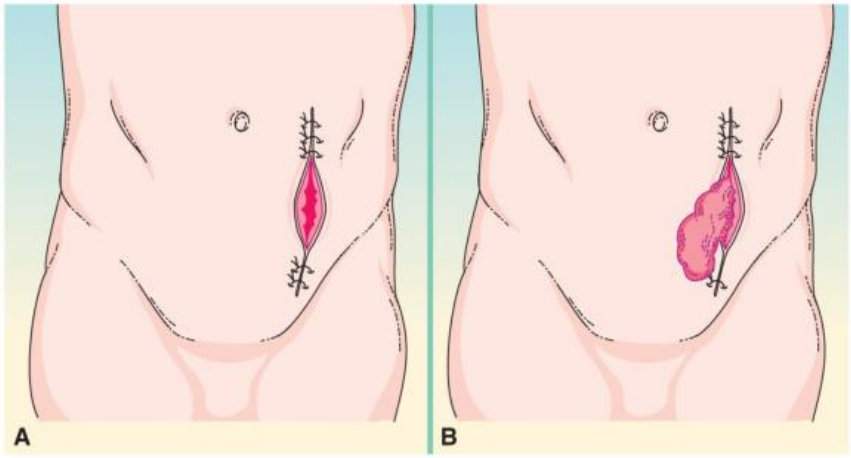


FIGURE 28-7 **(A)** Wound dehiscence. **(B)** Wound evisceration.

Wound Management

- Wound management involves changing dressings, caring for drains, removing sutures or staples when directed by the surgeon, applying bandages and binders, and administering irrigations.

Dressings

- **Dressing** purposes:
  - Keeping the wound clean
  - Absorbing drainage
  - Controlling bleeding
  - Protecting the wound from further injury
  - Holding medication in place
  - Maintaining a moist environment
- The most common wound coverings are gauze, transparent, and hydrocolloid

dressings.

Gauze Dressings

- Gauze dressings are made of woven cloth fibers. Their highly absorbent nature makes them ideal for covering fresh wounds that are likely to bleed or wounds that exude drainage.

Unfortunately, gauze dressings obscure the wound and interfere with wound assessment.

- Gauze dressings usually are secured with tape. If gauze dressings need frequent changing, **Montgomery straps** (strips of tape with eyelets) may be used.

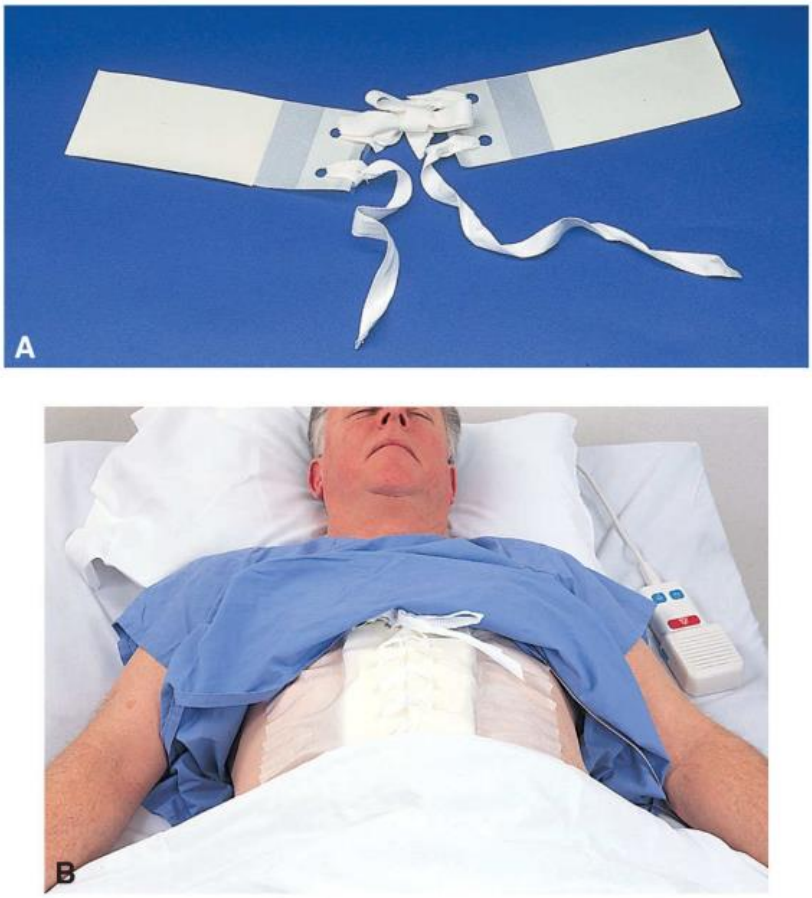


FIGURE 28-8 **(A)** The adhesive outer edge of Montgomery straps are applied to either side of a wound. **(B)** The inner edges of Montgomery straps are tied to hold a dressing over a wound. They prevent skin breakdown and wound disruption from repeated tape removal when checking or changing a dressing.

Transparent Dressings

- Transparent dressings are clear wound coverings. One of their chief advantages is that

they allow the nurse to assess a wound without removing the dressing.

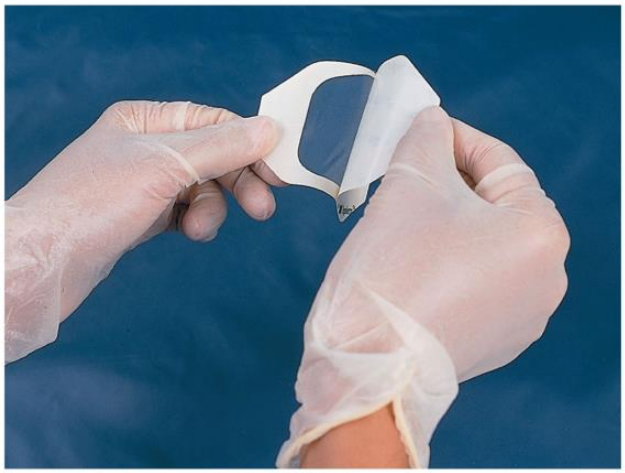


FIGURE 28-9 A transparent dressing. (Photo by B. Proud.)

Hydrocolloid Dressings

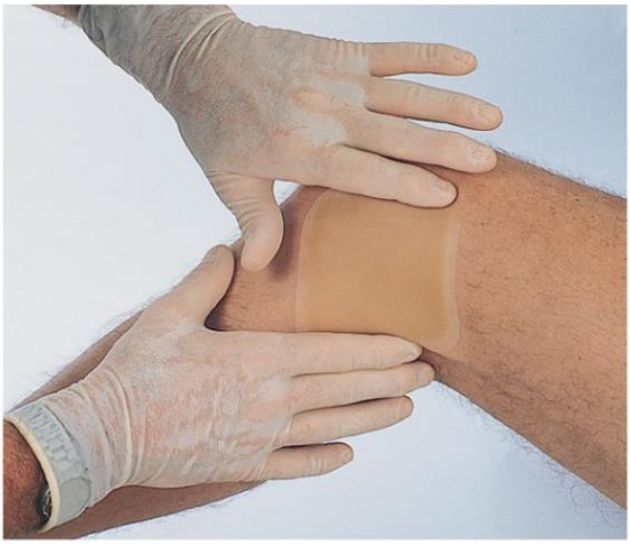


FIGURE 28-10 A hydrocolloid dressing absorbs drainage into its matrix.

- Hydrocolloid dressings are self-adhesive, opaque (اللَّوْن) أَكْمَدُ, air- and water-occlusive wound coverings. They keep wounds moist. Moist wounds heal more quickly because new cells grow more rapidly in a wet environment. If the hydrocolloid dressing remains intact, it can be left in place for up to 1 week.

Dressing Changes

- Nurses change dressings when:
  - A wound requires assessment or care
  - The dressing becomes loose or saturated with drainage.

Drains

- **Drains** are tubes that provide a means for removing blood and drainage from a wound. They promote wound healing by removing fluid and cellular debris

Open Drains

- Open drains are flat, flexible tubes that provide a pathway for drainage toward the dressing. Draining occurs passively by gravity and **capillary action.** Sometimes a safety pin or long clip is attached to the drain as it extends from the wound.
- As the drainage decreases, the physician may instruct the nurse to shorten the drain.

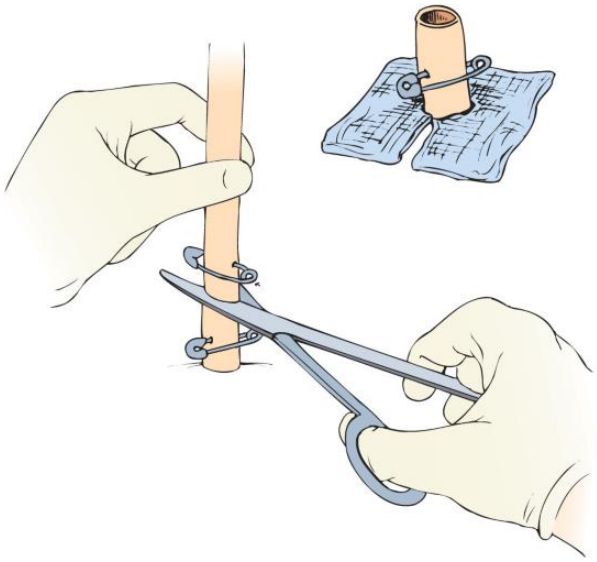


FIGURE 28-11 An open drain is pulled from the wound, and the excess portion is cut. A drain sponge is placed around the drain, and the wound is covered with a gauze dressing.

Closed Drains

- Closed drains are tubes that terminate in a receptacle. Some examples of closed drainage systems are a Hemovac.
- Closed drains are more efficient than open drains because they pull fluid by creating

a vacuum or negative pressure.

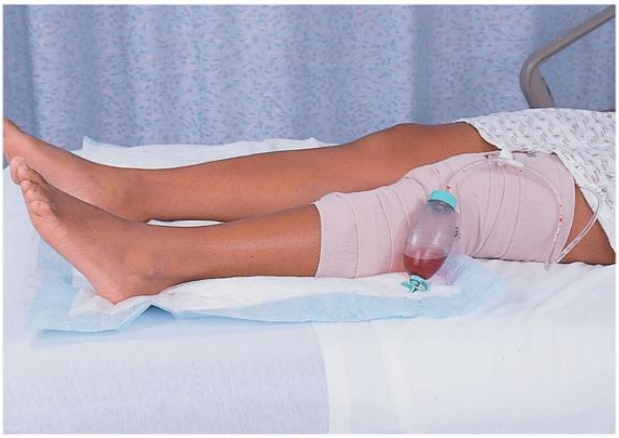


FIGURE 28-12 A Jackson-Pratt (closed) drain. (Photo by B. Proud.)

Sutures and Staples

- **Sutures**, knotted ties that hold an incision together, generally are constructed from silk or synthetic materials such as nylon.
- **Staples** (wide metal clips) perform a similar function. Staples do not encircle a wound like sutures; instead, they form a bridge that holds the two wound margins together.

- Sutures and staples are left in place until the wound has healed sufficiently to prevent reopening. Depending on the location of the incision, this may be a few days to as long as 2 weeks.

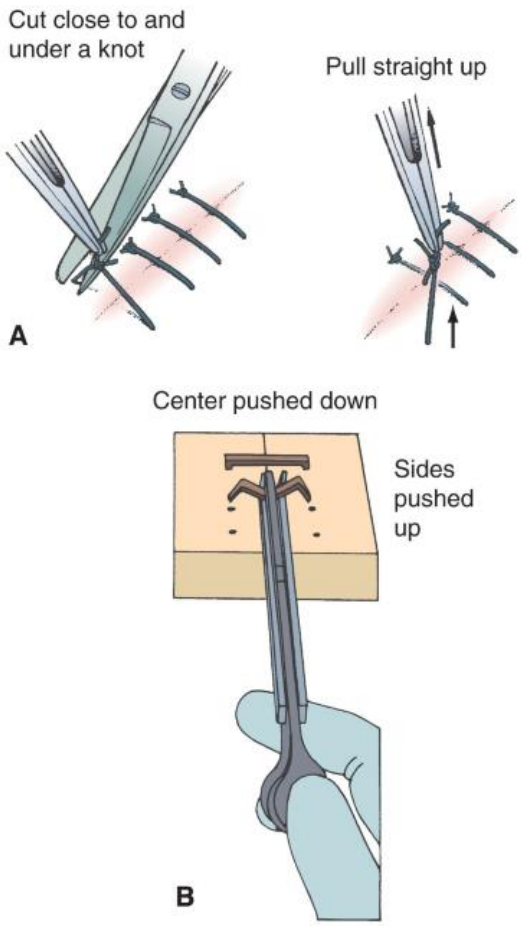


FIGURE 28-15 **(A)** A technique for suture removal. **(B)** A technique for staple removal

Bandages and Binders

- A **bandage** is a strip or roll of cloth wrapped around a body part. One example is Crib bandage.
- A **binder** is a type of bandage generally applied to a particular body part such as the abdomen or breast.

Debridement

- Some wounds require **debridement** (removal of dead tissue) to promote healing. The four methods for debriding a wound are sharp, enzymatic, autolytic, and mechanical.

Sharp Debridement

- Sharp debridement is the removal of **necrotic tissue** (nonliving tissue) from the healthy areas of a wound with sterile scissors, forceps, or other instruments.

Enzymatic Debridement

- Enzymatic debridement involves the use of topically applied chemical substances that break down and liquefy wound debris.
- This form of debridement is appropriate for uninfected wounds or for clients who cannot tolerate sharp debridement.

Wound Irrigation

- Wound irrigation generally is carried out just before applying a new dressing. This technique is best used when granulation tissue has formed. Surface debris should be removed gently without disturbing the healthy proliferating cells.

Heat and Cold Applications

- Heat and cold have various therapeutic uses.
- The terms hot and cold are subject to wide interpretation.

BOX 28-1 Common Uses for Heat and Cold Applications

USES FOR HEAT	USES FOR COLD
Provides warmth	Reduces fevers
Promotes circulation	Prevents swelling
Speeds healing	Controls bleeding
Relieves muscle spasm	Relieves pain
Reduces pain	Numbs sensation

TABLE 28-2 Temperature Ranges for Applications of Heat and Cold

LEVEL OF HEAT OR COLD	TEMPERATURE RANGE
Very hot	40.5°–46.1°C (105°–115°F)
Hot	36.6°–40.5°C (98°–105°F)
Warm and neutral	33.8°–36.6°C (93°–98°F)
Tepid	26.6°–33.8°C (80°–93°F)
Cool	18.3°–26.6°C (65°–80°F)
Cold	10°–18.3°C (50°–65°F)
Very cold	Below 10°C (below 50°F)

Therapeutic Baths

- **Therapeutic baths** (those performed for other than hygiene purposes) help to reduce a high fever or apply medicated substances to the skin to treat skin disorders or discomfort.
- The most common type of therapeutic bath is a sitz bath (soak of the perianal area). Sitz baths reduce swelling and inflammation and promote healing of wounds after a hemorrhoidectomy (surgical removal of engorged veins inside and outside the anal sphincter) or an episiotomy (incision that facilitates vaginal birth).

Pressure Ulcers

- A **pressure ulcer** is a wound caused by prolonged capillary compression that is sufficient to impair circulation to the skin and underlying tissue. The primary goal in managing pressure ulcers is prevention. Once a pressure ulcer forms, however, the nurse implements measures to reduce its size and to restore skin and tissue integrity

- Pressure ulcers or sores, also referred to as *decubitus ulcers*, most often appear over bony prominences of the sacrum, hips, and heels. They also can develop in other locations such as the elbows, shoulder blades, back of the head, and places where pressure is unrelieved because of infrequent movement.

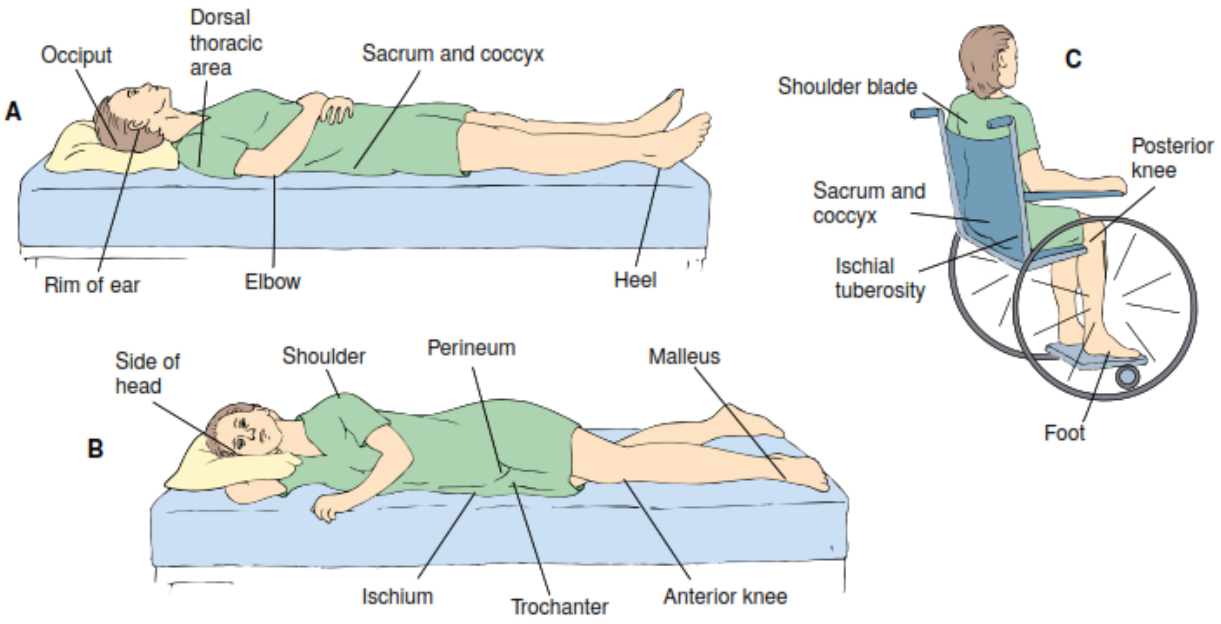


FIGURE 28-20 Locations where pressure ulcers commonly form. **A.** The supine position. **B.** A side-lying position. **C.** The sitting position.

- The tissue in these areas is particularly vulnerable because body fat, which acts as a pressure-absorbing cushion, is minimal. Consequently, the tissue is compressed between the bony mass and a rigid surface such as a chair seat or bed mattress. If the compression on local capillaries continues without intermittent relief, the cells die from lack of oxygen and nutrition.

pressure-absorbing cushion

Stages of Pressure Ulcers

- Pressure ulcers are grouped into four stages according to the extent of tissue injury.

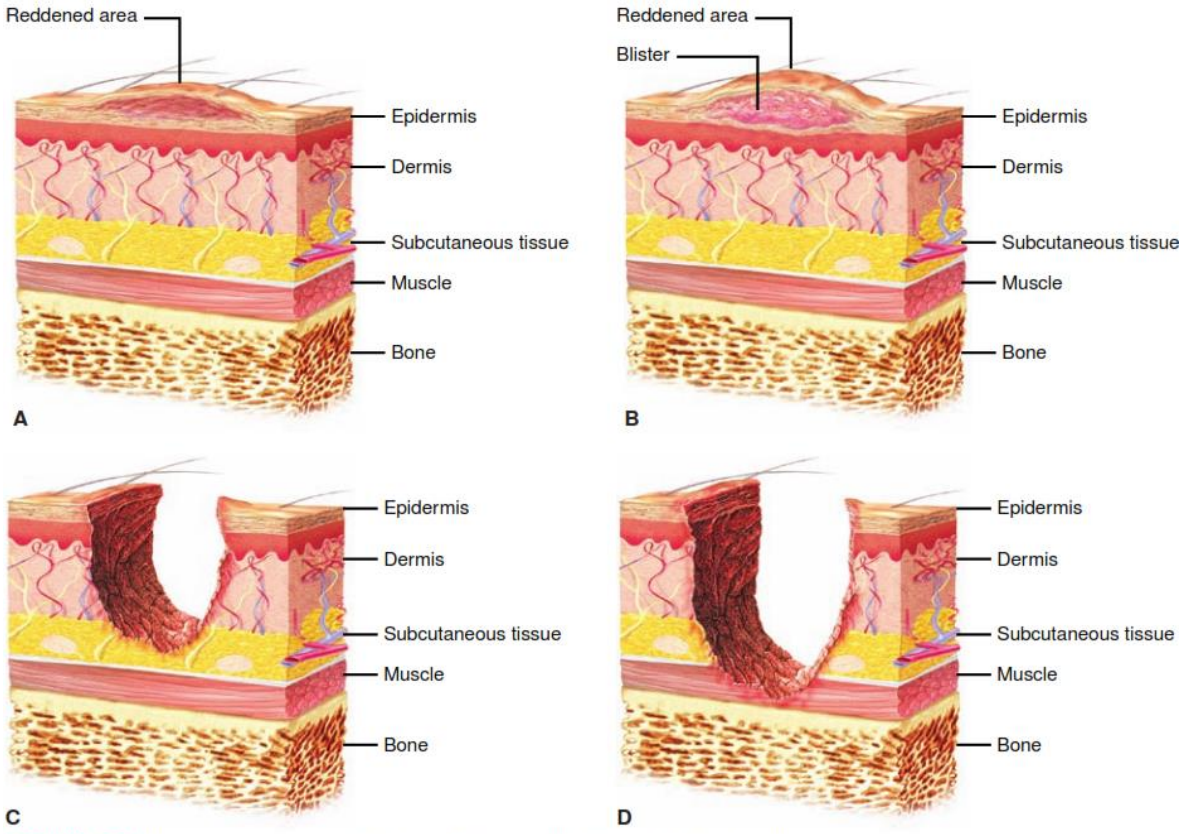


FIGURE 28-21 Pressure sore stages. **A.** Stage I. **B.** Stage II. **C.** Stage III. **D.** Stage IV.

- Stage I is characterized by intact but reddened skin. The hallmark of cellular damage is skin that remains red and fails to resume its normal color when pressure is relieved.
- A stage II pressure ulcer is red and accompanied by blistering or a **skin tear** (shallow break in the skin). Impairment of the skin may lead to colonization and infection of the wound.

- A stage III pressure ulcer has a shallow skin crater that extends to the subcutaneous tissue. It may be accompanied by **serous drainage** (leaking plasma) or **purulent drainage** (white or greenish fluid) caused by a wound infection. The area is relatively painless despite the severity of the ulcer.
- Stage IV pressure ulcers are life threatening. The tissue is deeply ulcerated, exposing

muscle and bone. The dead or infected tissue may produce a foul odor. The infection easily spreads throughout the body, causing **sepsis** (potentially fatal systemic infection).

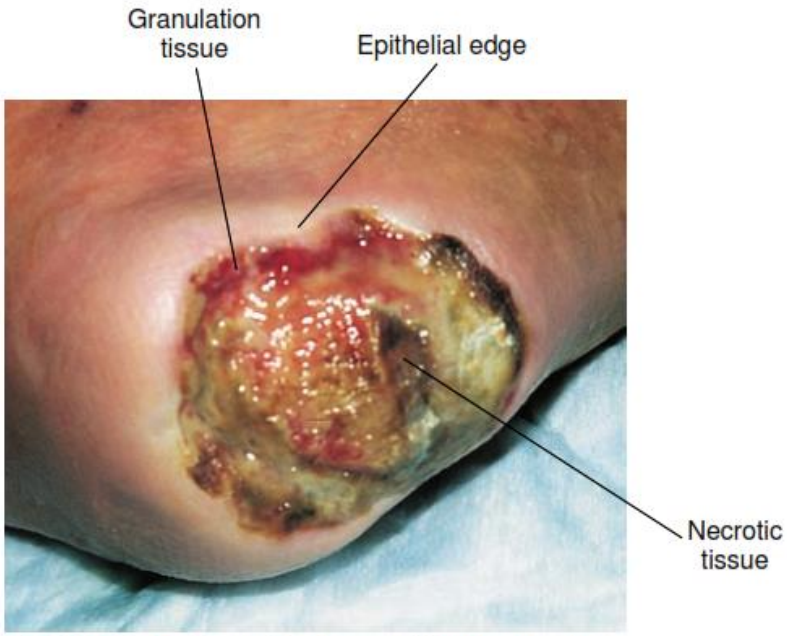


FIGURE 28-22 Example of stage IV pressure sore.

Prevention of Pressure Ulcers

- The first step in prevention is to identify clients with risk factors for pressure ulcers. The second step is to implement measures that reduce conditions under which pressure ulcers are likely to form. See Nursing Guidelines 28-2.

BOX 28-2 Risk Factors for Developing Pressure Ulcers

- Inactivity
- Immobility
- Malnutrition
- Emaciation
- Diaphoresis
- Incontinence
- Vascular disease
- Localized edema
- Dehydration
- Sedation

NURSING GUIDELINES 28-2

Preventing Pressure Ulcers

- Change the bedridden client's position frequently. Remind a client who is sitting in a chair to stand and move hourly or at least to shift his or her weight every 15 minutes while sitting. *Changing positions relieves pressure and restores circulation.*
- Lift rather than drag the client during repositioning. *Dragging causes friction, which abrades the skin and damages underlying blood vessels.*
- Avoid using plastic-covered pillows when positioning clients. *Plastic prevents evaporation of perspiration because it is nonporous. It also raises skin temperature, further contributing to the growth of microorganisms.*
- Use positioning devices such as pillows to keep two parts of the body from direct contact with each other. *Such devices absorb perspiration, reduce localized heat, and avoid the compression of tissue between two body parts.*
- Use the lateral oblique position (see Chap. 23) rather than the conventional lateral position for side lying. *The lateral oblique position more effectively reduces the potential for pressure on vulnerable bony prominences.*
- Massage bony prominences only if the skin blanches with pressure relief. *Massage improves circulation to normal tissue but causes further damage to areas where pressure ulcers—even those that are stage I—are already established.*
- Keep the skin clean and dry especially when clients cannot control their bladder or bowel function. *Cleansing removes substances that chemically injure the skin.*
- Use a moisturizing skin cleanser rather than soap, if possible. *A nonsoap cleanser maintains skin hydration and avoids altering the skin's natural acidity, which protects it from bacterial colonization.*
- Rinse and dry the skin well. *Cleansing then drying removes chemical residues and surface moisture.*
- Use pressure-relieving devices such as special beds or mattresses (see Chap. 23). *These special devices maintain capillary blood flow by reducing pressure.*
- Pad body areas such as the heels, ankles, and elbows, which are vulnerable to friction and pressure (see Fig. 28-23). *Padding prevents friction and adds a cushioning layer over the bony prominence.*
- Use seat cushions such as a commercial gel-filled pad when clients sit for extended periods. *These cushions distribute pressure over a wider area, relieving direct pressure on the coccyx.*
- Keep the head of the bed elevated no more than 30 degrees. *Sliding down in bed can produce a* shearing force *(the effect that moves layers of tissue in opposite directions).*
- Provide a balanced diet and adequate fluid intake. *Adequate nutrition maintains and restores cells and keeps tissues hydrated.*

Nursing Implications

- Acute Pain
- Impaired Skin Integrity
- Ineffective Peripheral Tissue Perfusion
- Impaired Tissue Integrity
- Risk for Infection

Chapter 6

Gastrointestinal Intubation

Learning Objectives

On completion of this chapter, the Students should be able to:

1. Define intubation and list reasons for gastrointestinal intubation.
2. Identify four general types of gastrointestinal tubes.
3. Name at least four assessments that are necessary before inserting a tube nasally.
4. Explain the purpose of and how to obtain a **N**ose-to-**E**arlobe-to-the-**X**iphoid (NEX) measurement.
5. Describe two methods for determining distal placement in the stomach.
6. Discuss three ways that nasointestinal feeding tubes or their insertion differ from their gastric counterparts.
7. Name four schedules for administering tube feedings.
8. Explain the purpose of assessing gastric residual.
9. Name five nursing activities involved in managing the care of clients who are being tube-fed.
10. Name two nursing responsibilities for assisting with the insertion of a tungsten-weighted intestinal decompression tube.

Gastrointestinal Intubation

- Clients, especially those undergoing abdominal or gastrointestinal (GI) surgery, may require some type of tube placed within their stomach or intestine. Use of a gastric or intestinal tube reduces or eliminates problems associated with surgery or conditions affecting the GI tract such as impaired peristalsis, vomiting, or gas accumulation. Tubes also can nourish clients who cannot eat.

- This chapter discusses the multiple uses for gastric and intestinal tubes and the nursing guidelines and skills for managing associated client care.

Intubation

- **Intubation** generally means the placement of a tube into a body structure; in this chapter, it refers specifically to insertion of a tube into the stomach or intestine by way of the mouth or nose.

- **Orogastric intubation** (insertion of a tube through the mouth into the stomach). Such as Ewald tube.
- **Nasogastric intubation** (insertion of a tube through the nose into the stomach.
- **Nasointestinal intubation** (insertion of a tube through the nose to the intestine) are performed to remove gas or fluids or to administer liquid nourishment.
- A tube also may be inserted within an ostomy (surgically created opening). A prefix identifies the anatomic site of the ostomy; for instance, a gastrostomy is an artificial opening into the stomach

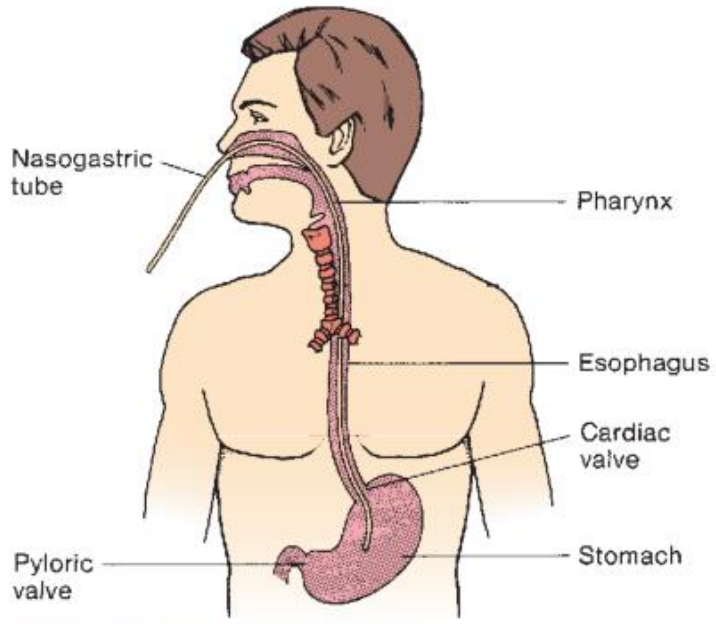


FIGURE 29-1 The nasogastric intubation pathway.

- **Gastric or intestinal tubes are used for a variety of reasons, including the following:**
  - Performing a **gavage** (providing nourishment)
  - Administering oral medications that the client cannot swallow
  - Obtaining a sample of secretions for diagnostic testing
  - Performing a **lavage** (removing substances from the stomach, typically poisons)
  - Promoting **decompression** (removing gas and liquid contents from the stomach or bowel)
  - Controlling gastric bleeding, a process called compression or **tamponade** (pressure)

Types of Tubes

- Although all gastric and intestinal tubes have a proximal and distal end, their size, construction, and composition vary according to their use.

- Tubes can be identified according to the location of their insertion (mouth, nose, or abdomen) or the location of their distal end (stomach [gastric] or intestinal).

TABLE 29-1 Types of Gastrointestinal Tubes

TUBE	PURPOSE	CHARACTERISTICS
Orogastric		
Ewald	Lavage	• Large diameter: 36–40 F • Single lumen • Multiple distal openings for drainage
Nasogastric		
Levin	Lavage Gavage Decompression Diagnostics	• Usual adult size 14–18 F • Single lumen • 42–50 in. (107–127 cm) long • Multiple drain openings
Salem sump	Decompression	• Same diameter as Levin • Double lumen • Pigtail vent • 48 in. (122 cm) long • Marked at increments to indicate depth of insertion • Radiopaque
Sengstaken–Blakemore	Compression Drainage	• Usual diameter: 20 F • 36 in. (90 cm) long • Triple lumen; two lead to balloons in the esophagus and stomach and the third is for removing gastric drainage; a fourth lumen may be used to remove pharyngeal secretions
Nasointestinal		
Keofeed	Gavage	• Small diameter: 8 F • 36 in. (90 cm) long • Polyurethane or silicone • Weighted tip • Extremely flexible and may require the use of a stylet during insertion • Radiopaque • Bonded lubricant that becomes activated with moisture
Maxter	Intestinal decompression	• Usual size: 18 F • 100 in. (250 cm) long • Double lumen • Tungsten-weighted tip • Graduated marks every 10 in. (25 cm)
Transabdominal		
Gastrostomy	Gavage; may be used for decompression while the client is fed through a jejunostomy tube	• Sizes 12–24 F for adults • Rubber or silicone • May have additional side ports for balloon inflation to maintain placement • May be capped or plugged between feedings • Radiopaque
Jejunostomy	Gavage	• Sizes 5–14 F for adults • Silicone or polyurethane • Radiopaque

1. Orogastric Tubes

- An **orogastric tube** (tube inserted at the mouth into the stomach), such as an Ewald

tube, is used in an emergency to remove toxic substances that have been ingested. The diameter of the tube is large enough to remove pill fragments and stomach debris

2. Nasogastric Tubes

- A **nasogastric tube** (tube placed through the nose and advanced to the stomach) is smaller in diameter than an orogastric tube but larger and shorter than a nasointestinal tube. Some nasogastric tubes have more than one **lumen** (channel) within the tube. with multiple uses: decompression to remove fluid and gas from the stomach
- A Levin tube is a commonly used, single-lumen gas-tric tube

- Because nasogastric tubes remain in place for several days or more, many clients complain of nose and throat discomfort.

- Furthermore, gastric tubes tend to dilate the esophageal sphincter,

- The stretched opening may contribute to **gastric reflux** (reverse flow of gastric contents), If gastric reflux occurs, the liquid could enter the airway and interfere with respiratory function.

3. Nasointestinal Tubes

- **Nasointestinal tubes** (tubes inserted through the nose for distal placement below the stomach) are longer than their gastric counterparts.
- They are used to provide nourishment (feeding tubes) or to remove gas and liquid contents from the small intestine (decompression tubes).

4. Transabdominal Tubes

- **Transabdominal tubes** (tubes placed through the abdominal wall) provide access to various parts of the GI tract. Two examples are a **gastrostomy tube** or G-tube (transabdominal tube located within the stomach). **Jejunostomy tube** or J-tube (a transabdominal tube that leads to the jeju-num of the small intestine).

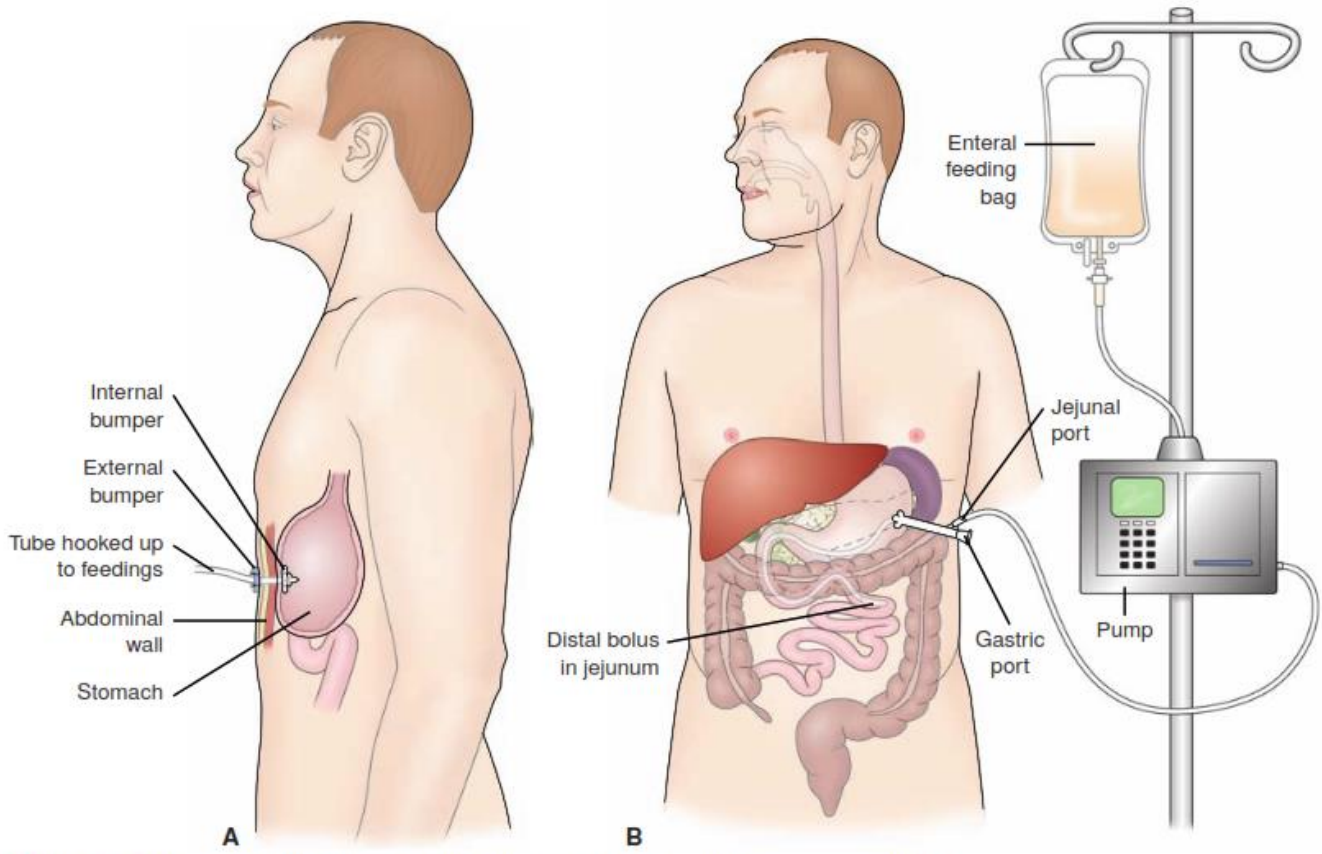


FIGURE 29-4 Transabdominal tubes. **A.** A percutaneous endoscopic gastrostomy (PEG) tube. **B.** A percutaneous endoscopic jejunostomy (PEJ) tube. (Courtesy of IVAC Corporation, San Diego, CA.)

Nasogastric Tube Management

- Usually nurses insert nasogastric tubes. Additional nursing responsibilities include keeping the tube patent (or unobstructed), implementing the prescribed use, and removing the tube when it has accomplished its therapeutic purpose.

Insertion

- Inserting a nasogastric tube involves preparing the client, conducting pre-intubation assessments, and placing the tube.

Client Preparation

- Most clients are anxious about having to swallow a tube.
- Explaining the procedure and giving instructions on how the client can assist while the tube is being passed may further reduce anxiety.

Pre-intubation Assessment

- Level of consciousness
- Weight
- Bowel sounds
- Abdominal distention
- Integrity of nasal and oral mucosa
- Ability to swallow, cough, and gag
- Any nausea and vomiting

Nasal Inspection

- One main goal of the assessment is to determine which nostril is best to use when inserting the tube and the length to which the tube will be inserted.
- the nurse inspects each nostril for size, shape, and patency. The client should exhale while each nostril in turn is occluded. The presence of nasal polyps (small growths of tissue), a deviated septum (nasal cartilage deflected from the midline of the nose), or a narrow nasal passage excludes a nostril for tube insertion.

Tube Measurement

- before inserting a tube, the nurse obtains the client's **NEX measurement** (length from nose to earlobe to the xiphoid process [tip of the sternum]; and marks the tube appropriately.
- The first mark on the tube is made at the measured distance from the nose to the earlobe. It indicates the distance to the nasal pharynx, a location that places the tip at the back of the throat but above where the gag reflex is stimulated.
- A second mark is made at the point where the tube reaches the xiphoid process, indicating the depth required to reach the stomach.

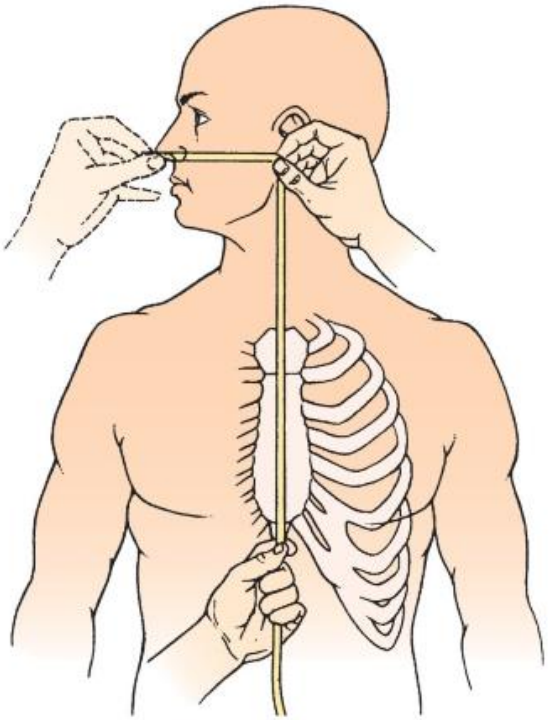


FIGURE 29-5 Obtaining the NEX measurement.

Tube Placement

- When inserting a nasogastric tube, the nurse's primary concerns are to cause as little discomfort as possible, to preserve the integrity of the nasal tissue, and to locate the tube within the stomach, not in the respiratory passages.
- Once the tube is at its final mark, the nurse must verify the location within the stomach.

- **The physical assessment methods that nurses use to determine the distal location of a nasogastric tube are as follows:**

  - Aspirating fluid: If aspirated fluid appears clear, brownish-yellow, or green, the nurse can presume that its source is the stomach.
  - Auscultating the abdomen: The nurse instills 10 mL or more of air while listening with a stethoscope over the abdomen. If a swooshing sound is heard, the nurse can infer that the cause was air entering the stomach. Belching often indicates that the tip is still in the esophagus.

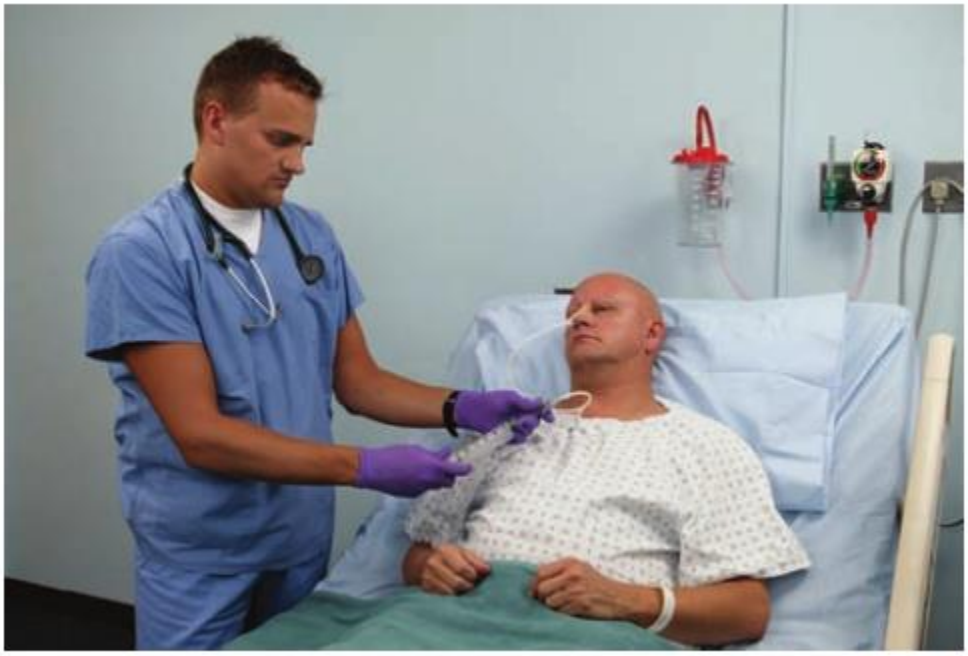


FIGURE 29-6 Aspirating gastric fluid.

- Testing the pH of aspirated liquid: The first two techniques provide only presumptive signs that the tube is in the stomach; testing pH confirms acidic gastric contents. Other than obtaining an abdominal x-ray, the pH test is the most accurate technique for checking tube placement.

- Wash hands or perform an alcohol-bused hand rub. Hand hygiene reduces the transmission of microorganisms.
- Don gloves. They provide a physical harrier between the nurse's hands and body fluids.
- Aspirate a small volume of fluid from the tube with a clean syringe. Doing so ensures valid test results.
- Drop a sample of gastric fluid onto an indicator strip. This step initiates a chemical reaction on contact and saturation.
- Compare the color on the test strip with the color guide on the container of reagent strips (see Fig. 29-7). The color of the test strip changes according to the hydrogen ion concentration of the liquid. Stomach fluid usually has a pH of 1 to 3--very acid on the pH scale. If the pH is 5 or 6, the client may he receiving medications to decrease gastric acidity or the fluid may be from the duodenum. A pH of 7 or greater indicates that the tube is in the respiratory tract.

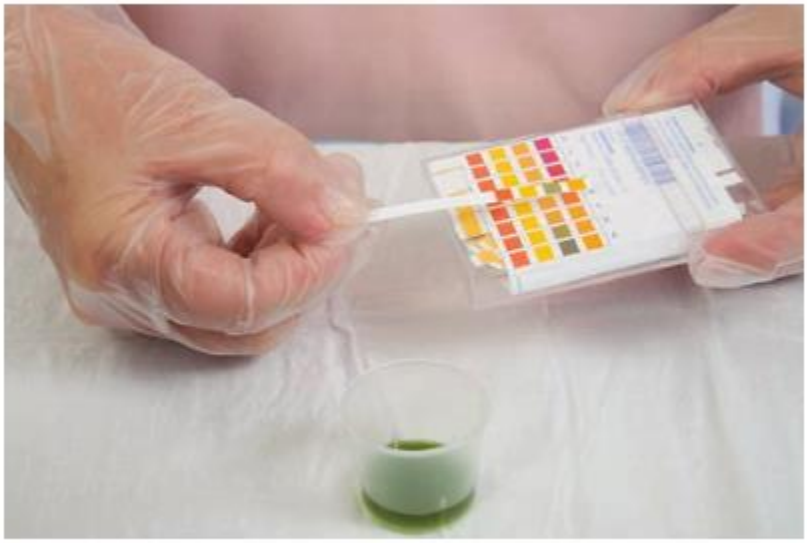


FIGURE 29-7 Checking the pH.

- Once the nurse has confirmed stomach placement (using two methods is best), he or she secures the tube to avoid upward or downward migration.

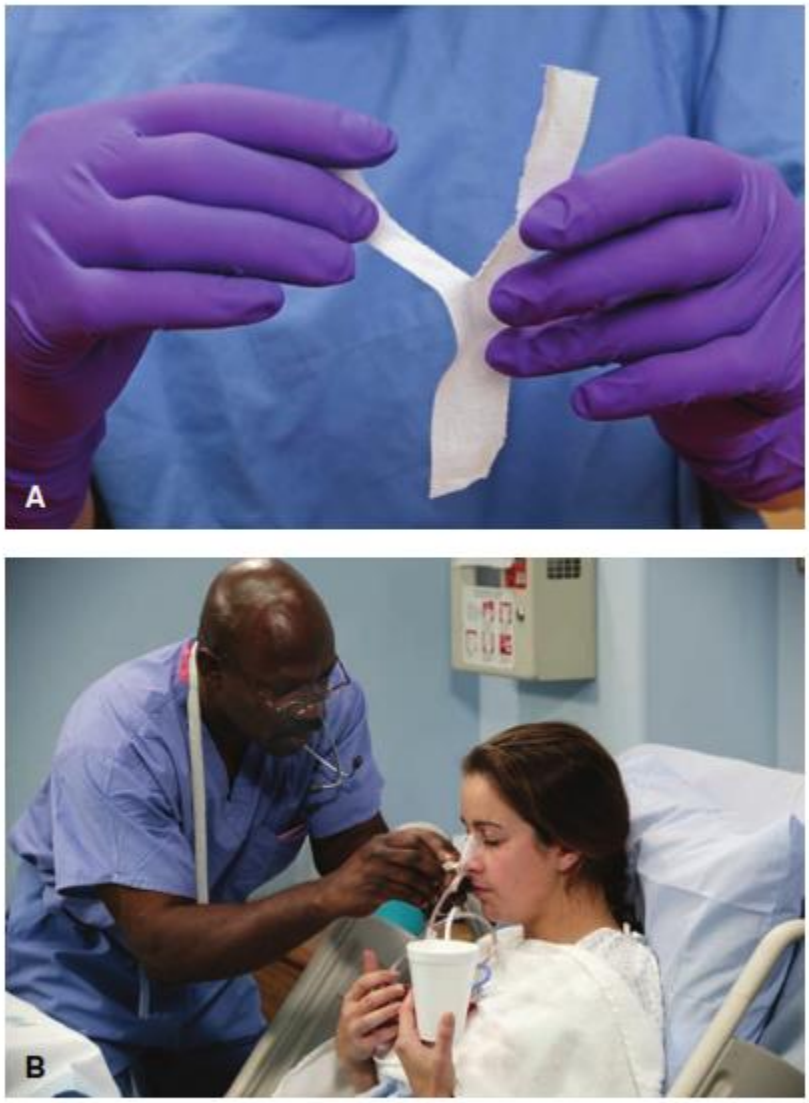


FIGURE 29-8 **A.** One end of a piece of tape is split, forming two narrower strips, and the opposite end is left intact. **B.** The wider intact end of the tape is applied to the nose, and the narrower strips are wound around the tube in opposite directions to secure the nasogastric tube.

Use and Maintenance

- Nasogastric tubes are connected to suction for gastric decompression or are used for tube feeding.

Gastric Decompression

- Suction is either continuous or intermittent.
- The tube is connected to a wall outlet or portable suction machine.

FIGURE 29-7 Suction removes liquids and gas from the stomach.

Promoting Patency

with intermittent suctioning

- Giving ice chips or occasional sips of water to a client who is otherwise NPO promotes tube patency. The fluid helps to dilute the gastric secretions.

Restoring Patency

- The nurse assesses tube patency frequently by monitoring the volume and characteristics of drainage and observing for signs and symptoms suggesting an obstruction (nausea, vomiting, and abdominal distention).
- Sometimes the nasogastric tube must be irrigated to maintain or restore patency.

Removal

- Nurses remove a nasogastric tube when the client's condition improves, when the tube becomes hopelessly obstructed, or according to the agency's standards for maintaining the integrity of the nasal mucosa.

- Unobstructed larger-diameter tubes usually are removed and changed at least every 2 to 4 weeks for adults. Small-diameter, flexible tubes are removed and changed every 4 weeks to 3 months, depending on agency policy.

Transabdominal Tube Management

- The physician inserts transabdominal tubes, such as gastrostomy and jejunostomy tubes, but the nurse is responsible for assessing and caring for them and their insertion sites. Conscientious care is necessary because gastrostomy tubes may leak and cause skin breakdown.

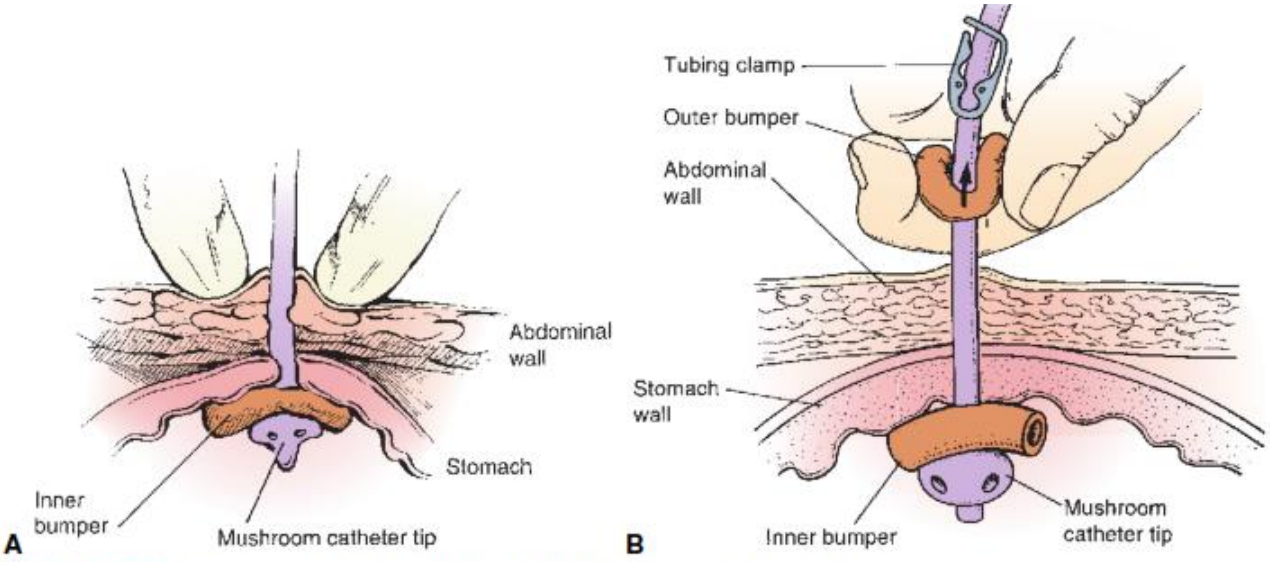


FIGURE 29-12 Inspection. **A.** Inspecting for drainage. **B.** Inspecting the skin.

Causes of gastrostomy leaks

- Disconnection between the feeding delivery tube and G-tube
- Clamped G-tube while tube feeding is infusing
- Mismatch between the size of the G-tube and stoma
- increased abdominal pressure from formula accumulation,
- retching, sneezing, and coughing
- Underinflation of the balloon beneath the skin
- Less than optimal stoma or stomal location

Tube Feedings

- Providing nutrition by the oral route is always best. However, if oral feedings are impossible, nourishment is provided enterally or parenterally.

- Tube feedings are used when clients have an intact stomach or intestinal function but are unconscious, have undergone extensive mouth surgery, have difficulty swallowing, or have esophageal or gastric disorders.

Benefits and Risks

- For example, **dumping syndrome** (cluster of symptoms from the rapid deposition of calorie-dense nourishment into the small intestine). The symptoms, which include weakness, dizziness, sweating, and nausea, are caused by fluid shifts from the circulating blood to the intestine and low blood glucose level related to a surge of insulin. Diarrhea also may result when administering hypertonic formula solutions.

Formula Considerations

- In addition to the type of tube and the access site, the type of formula also is individualized, based on the client's nutritional needs.
- Factors include the client's weight, nutritional status, and concurrent medical conditions and the projected length of therapy.

TABLE 29-4 Tube-Feeding Formulas

TYPE	EXAMPLES	DESCRIPTION
Standard, isotonic	Osmolite Isocal Nutren 1.0	Routine formulas for clients with normal digestion and absorption; do not alter water distribution. Provide approximately 1.0 cal/mL
High calorie	Comply Nutren 1.5 Nutren 2.0 Deliver 2.0	Provide up to double the amount of calories of standard formulas for clients who require a fluid restriction or have high calorie needs.
High protein	Promote Isocal HN Ultracal HN plus	Provide up to double the amount of protein of standard formulas.
Fiber containing	Jevity Compleat Ultracal	Provide fiber to normalize bowel function in clients with diarrhea or constipation.
Partially hydrolyzed	Criticare HN Optimental Vivonex T.E.N.	Provide nutrients in simple form that require little or no digestion for clients with impaired digestion or absorption.

Tube-Feeding Schedules

- Tube feedings may be administered on bolus, intermittent, cyclic, or continuous schedules.

Bolus Feedings

- A **bolus feeding** (instillation of liquid nourishment in less than 30 minutes four to six times a day) usually involves 250 to 400 mL of formula per administration.

Intermittent Feedings

- An **intermittent feeding** (gradual instillation of liquid nourishment four to six times a day) is administered over 30 to 60 minutes, the time most people spend eating a meal. The usual volume is 250 to 400 mL per administration.
- The container and feeding tube that hold the formula requires thorough flushing after each feeding to reduce the growth of microorganisms. Tube-feeding administration sets are replaced every 24 hours regardless of the feeding schedule.

Cyclic feeding

(continuous instillation of liquid nourishment for 8 to 12 hours) is followed by a 16- to 12-hour pause.

- Used to wean clients from tube feeding.

Continuous Feedings

- A **continuous feeding** (instillation of liquid nutrition without interruption) is administered at a rate of approximately 1.5 mL/minute. A feeding pump is used to regulate the instillation.
- It can be delivered directly into the small intestine.

Client Assessment

- The following daily assessments are standard for almost every client who receives tube feedings: weight, fluid intake and output, bowel sounds, lung sounds, temperature, condition of the nasal and oral mucous membranes, breathing pattern, gastric complaints, status of abdominal distention, vomiting, bowel elimination patterns, and skin condition at the site of a transabdominal tube.
- Once tube feedings have been initiated, it is also necessary to routinely assess the client's gastric residual (volume of liquid within the stomach).
- The nurse measures gastric residual to determine whether the rate or volume of feeding exceeds the client's physiologic capacity. Overfilling the stomach can cause gastric reflux, regurgitation, vomiting, aspiration, and pneumonia. As a rule of thumb, the gastric residual should be no more than 100 mL or no more than 20% of the previous hour's tube-feeding volume.
- If the gastric residual is high, the feeding is stopped and the gastric residual is rechecked every 30 minutes until it is within a safe volume.

Nursing Management

Maintaining Tube Patency

- To maintain patency, it is best to flush feeding tubes with 30 to 60 mL of water immediately before and after administering a feeding or medications, every 4 hours if the client is being continuously fed, and after refeeding the gastric residual**.**

Clearing an Obstruction

- Occasionally, it is possible to clear the tube with a solution of meat tenderizer or pancreatic enzyme.
- When an obstruction cannot be cleared, the tube is removed and another inserted rather than compromising nutrition by the delay

Providing Adequate Hydration

- Although tube feedings are approximately 80% water, clients usually require additional hydration. Adults require 30 mL of water per kilogram of body weight or 1 mL/kcal, on a daily basis

Dealing with Miscellaneous Problems

- Clients who require enteral feeding experience several common or potential problems. Many are associated with tube-feeding formulas or the mechanical effects of the tubes themselves.

TABLE 29-5 Common Tube-Feeding Problems

PROBLEM	COMMON CAUSES	SOLUTIONS
Diarrhea	Highly concentrated formula	Dilute initial tube feeding to one-quarter to one-half strength.
	Rapid administration	Start at 25 mL/hr and increase rate by 25 mL q12hr. Hang no more than 4 hours' worth of formula.
	Bacterial contamination	Wash hands. Change formula bag and tubing q24hr. Refrigerate unused formula.
	Lactose intolerance	Consult with the physician on using a milk-free formula.
	Inadequate protein content	Raise serum albumin levels with total parenteral nutrition solutions containing supplemental protein, or administer albumin intravenously.
	Medication side effects	Consult with the physician about adjusting drug therapy or administering an antidiarrheal.
Nausea and vomiting	Rapid feeding	Instill bolus and intermittent feedings by gravity.
	Overfeeding	Delay feeding until gastric residual is <100 mL or <20% of hourly volume.
	Air in stomach	Maintain sitting position for at least 30 minutes after feeding. Consult with the physician about ordering medication that facilitates gastric emptying. Administer continuous feedings. Instill feedings within the small intestine. Keep tubing filled with formula or water.
	Medication side effects	Consult with the physician about adjusting drug therapy or administering drugs to control symptoms.
Aspiration	Incorrect tube placement	Check placement before instilling liquids.
	Vomiting	Keep head elevated at least 30 degrees during feedings and for 30 minutes afterward.

		Keep cuffed tracheostomy and endotracheal tubes inflated. Refer to measures for controlling vomiting.
Constipation	Lack of fiber Dehydration	Change formula. Increase supplemental water. Consult with the physician on giving a laxative, enema, or suppository.
Elevated blood glucose level	Calorie-concentrated formula	Instill diluted formula and gradually increase concentration. Administer insulin according to medical orders.
Weight loss	Inadequate calories	Increase calories in formula. Increase rate or frequency of feedings.
Elevated electrolytes	Dehydration	Increase supplemental water.
Dry oral and nasal mucous membranes	Mouth breathing Dried nasal mucus	Provide frequent oral and nasal hygiene.
Middle ear inflammation	Narrowing or obstruction of eustachian tube from presence of tube in pharynx	Turn from side to side q2hr. Insert a small-diameter feeding tube.
Sore throat	Pressure and irritation from tube	Use a small-diameter feeding tube.
Plugged feeding tube	Instilling crushed or powdered medications through the tube	Use liquid medications. Dilute crushed drugs.
	Formula coagulation from drug-food interactions	Flush the tubing liberally after drug administration. Flush tubing with water before and after drug administration. Follow agency policy for alternative flush solutions such as carbonated beverages or solutions of meat tenderizer.
	Kinked tube	Maintain neck in neutral position or change position frequently.
	Large molecules in formula	Dilute formula. Flush tubing at least q4hr. Use a larger diameter feeding tube.
Dumping syndrome	Rapid and large instillation of highly concentrated formula into the intestine	Administer small, continuous volume. Adjust glucose content of formula.

Nursing Implications

- Imbalanced Nutrition: Less Than Body Requirements
- Feeding Self-Care Deficit
- Impaired Swallowing
- Risk for Aspiration
- Impaired Oral Mucous Membranes
- Diarrhea
- Constipation

Chapter 7
Urinary Elimination

Learning Objectives

On completion of this chapter, the students should be able to:

1. Identify the collective functions of the urinary system.
2. Describe the physical characteristics of urine and factors that affect urination.
3. Name four types of urine specimens that nurses commonly collect.
4. Identify three alternative devices for urinary elimination.
5. Define continence training.
6. Name three types of urinary catheters.
7 . Describe two principles that apply to using a closed drainage system.
8. Explain why catheter care is important in the nursing management of clients with retention catheters.
9. Discuss the purpose for irrigating a catheter and methods for performing this skill.
10. Define urinary diversion.
11. Discuss factors that contribute to impaired skin integrity in clients with a urostomy

Urinary Elimination

■The urinary system (Fig. 30-1) consists of the kidneys, ureters, bladder, and urethra. These major components, along with some accessory structures such as the ring-shaped muscles called the internal and external sphincters, work together to produce urine (fluid within the bladder), collect it, and excrete it from the body.

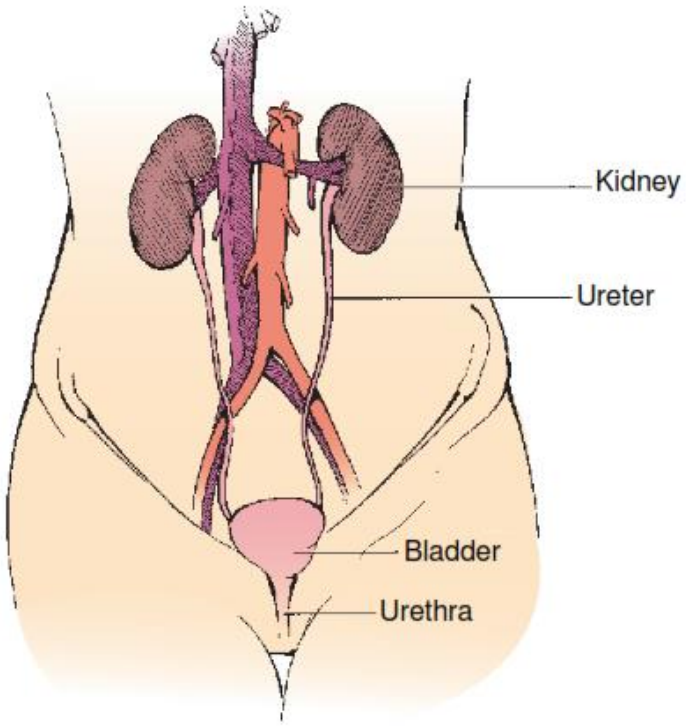


FIGURE 30-1 The major structures of the urinary system.

■**Urinary elimination** (the process of releasing excess fluid and metabolic wastes), or urination, occurs when urine is excreted. Under normal conditions, the average person eliminates approximately 1500 to 3000 mL of urine each day. The consequences of impaired urinary elimination can be life-threatening.

■The need to urinate becomes apparent when the bladder distends with approximately 150 to 300 mL of urine. The distention with urine causes increased fluid pressure, stimulating stretch receptors in the bladder wall and creating a desire to empty it of urine.

Patterns of urinary elimination depend on

- Physiologic
- Emotional,
- Social factors.
- Degree of neuromuscular development
- Integrity of the spinal cord
- Volume of fluid intake
- Amount of fluid losses,
- Amount and type of food consumed;
- Person's circadian rhythm,
- Habits,
- Opportunities for urination,
- Anxiety.

General measures to promote urination include:

- Providing privacy,

- Assuming a natural position for urination (sitting for women, standing for men),
- Maintaining an adequate fluid intake, and
- Using stimuli such as running water from a tap to initiate voiding.

Characteristics of Urine

TABLE 30-1 Characteristics of Urine

CHARACTERISTIC	NORMAL	ABNORMAL	COMMON CAUSES OF VARIATIONS
Volume	500–3,000 mL/day 1,200 mL/day average	<400 mL/day	Low fluid intake Excess fluid loss Kidney dysfunction
		>3,000 mL/day	High fluid intake Diuretic medication Endocrine diseases
Color	Light yellow	Dark amber	Dehydration
		Brown	Liver/gallbladder disease
		Reddish-brown	Blood
		Orange, green, blue	Water-soluble dyes
Clarity	Transparent	Cloudy	Infection Stasis
Odor	Faintly aromatic	Foul	Infection
		Strong	Dehydration
		Pungent	Certain foods

Urine Specimen Collection

Voided Specimens

■A **voided specimen** is a sample of fresh urine collected in a clean container. The first voided specimen of the day is preferred because it is most likely to contain substantial urinary components that have accumulated during the night.

Clean-Catch Specimens

■A **clean-catch specimen** is a voided sample of urine considered sterile and is sometimes called a ***mid-stream specimen*** because of how it is collected.

■As soon as the specimen is collected, it is labeled and taken to the laboratory.

Catheter Specimens

■A urine specimen can be collected under sterile conditions using a catheter, the nurse can aspirate a sample through the lumen of a latex catheter or from a self-sealing port (Fig. 30-2).

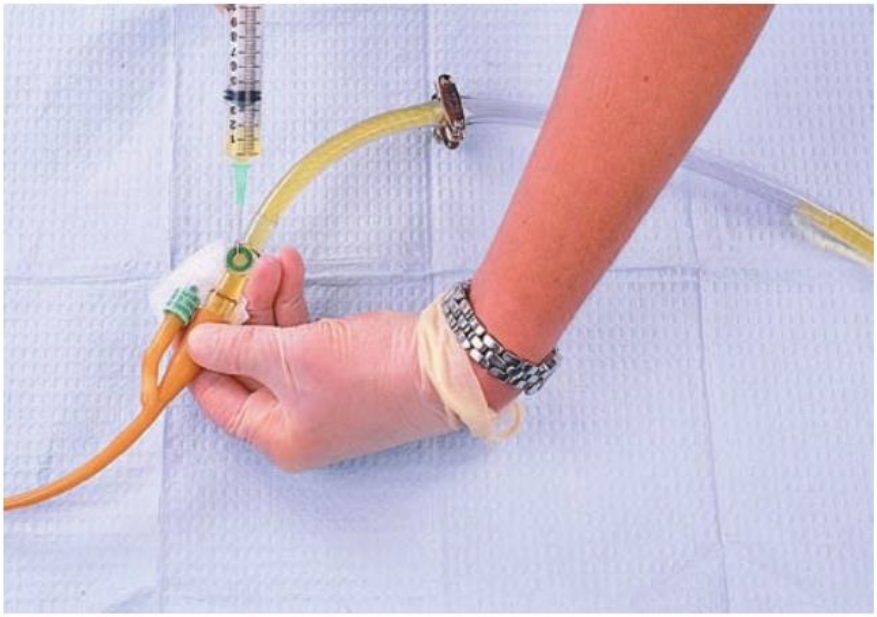


FIGURE 30-2 The location for collecting a catheter specimen. (Photo by B. Proud.)

24-Hour Specimens

■The nurse collects, labels, and delivers a **24-hour specimen** (collection of all urine produced in a full 24-hour period) to the laboratory for analysis.

Abnormal Urine Characteristics

■**Hematuria**: urine containing blood

■**Pyuria:** urine containing pus

■**Proteinuria:** urine containing plasma proteins

■**Albuminuria:** urine containing albumin, a plasma protein

■**Glycosuria**: urine containing glucose

■**Ketonuria:** urine containing ketones

Abnormal Urinary Elimination Patterns

■**Anuria** Means absence of urine or a volume of 100 mL or less in 24 hours. It indicates that the kidneys are not forming sufficient urine.

■**Oliguria** Urine output less than 400 mL per 24 hours, indicates inadequate elimination of urine.

■**Residual urine** More than 50 mL of urine that remains in the bladder after voiding

■**Polyuria** Means greater than normal urinary volume and may accompany minor dietary variations. For example, consuming higher than normal amounts of fluids, especially those with mild diuretic effects (e.g., coffee, tea), or taking certain medications actually can increase urination.

(nighttime urination) is unusual because the rate of urine production is normally reduced at night.

Difficult or uncomfortable voiding and a common symptom of trauma to the urethra or a bladder infection.

- (need to urinate often)

■(strong feeling that urine must be eliminated quickly) often accompany dysuria.

■**Incontinence**

Inability to control either urinary or bowel elimination and is abnormal after a person is toilet-trained.

Assisting Clients with Urinary Elimination

■Commode

- A **commode** (chair with an opening in the seat under which a receptacle is placed) is located beside or near the bed (Fig. 30-3).

FIGURE 30-3 A bedside commode.

■Urinal

- A **urinal** is a cylindrical container for collecting urine. It is more easily used by males.

■Using a Bedpan

- A **bedpan** (seatlike container for elimination) is used to collect urine or stool.

Catheterization

■**Catheterization** (act of applying or inserting a hollow tube), A urinary catheter is used for various reasons:

- Keeping incontinent clients dry.

  (catheterization is a last resort that is used only when all other continence measures have been exhausted)
- Relieving bladder distention when clients cannot void.

■Assessing fluid balance accurately

■Keeping the bladder from becoming distended during procedures such as surgery

■Measuring the residual urine

■Obtaining sterile urine specimens

■Instilling medication within the bladder

Types of Catheters

■**External Catheters**

- An **external catheter** (urine-collecting device applied to the skin) is not inserted

within the bladder; instead, it surrounds the urinary meatus. Examples of external catheters are a condom catheter (Fig. 30-7) External catheters are more effective for **male clients**.

■Straight Catheters

- A **straight catheter** is a urine drainage tube inserted but not left in place. It drains urine temporarily or provides a sterile urine specimen

■Retention Catheters

- A **retention catheter**, also called an indwelling catheter, is left in place for a period of time. The most common type is a Foley catheter.

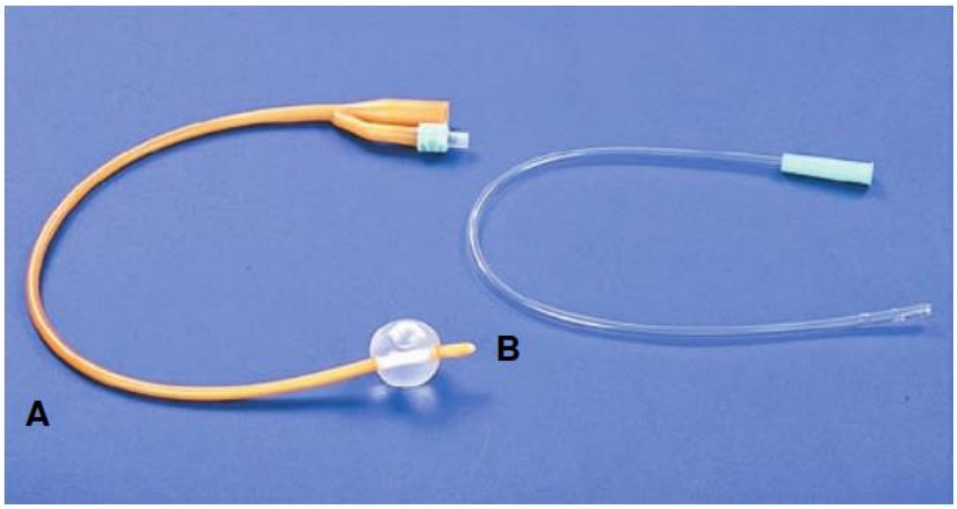


FIGURE 30-9 Types of urinary catheters. **A.** A retention (Foley) catheter with balloon. **B.** A straight catheter. (Photo by B. Proud.)

■Unlike straight catheters, retention catheters are secured with a balloon that is inflated once the distal tip is within the bladder. Both straight and retention catheters available in various diameters, sized according to the French scale: for adults, sizes 14, 16, and 18 F are commonly used.

Inserting a Catheter

Providing Catheter Care

■"Catheters left in place for more than a few weeks become encrusted or obstructed, and lead to infection. In addition, bacteria that adhere to the urinary catheter develop a complex biologic structure, which protects them from antibiotics"

■**Catheter care** (hygiene measures used to keep the meatus and adjacent area of the catheter clean) helps to prevent the growth and spread of colonizing pathogens.

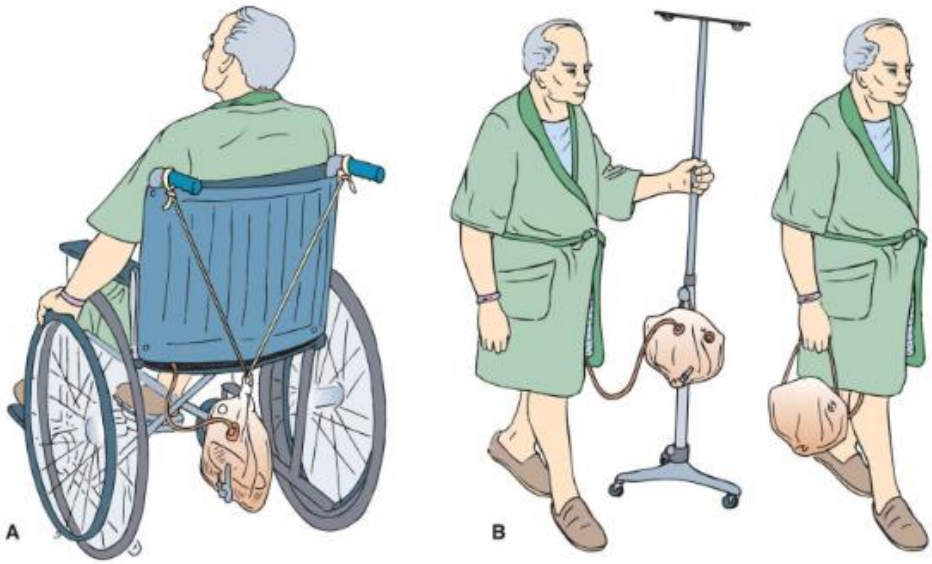


FIGURE 30-10 Techniques for suspending a drainage system below the bladder. **(A)** A wheelchair patient. **(B)** An ambulating patient with and without an IV pole.

Continuous Irrigation

■A **continuous irrigation** (ongoing instillation of solution) instills irrigating solution into a catheter by gravity over a period of days.

■Continuous irrigations keep a catheter patent after prostate or other urologic surgery in which blood clots and tissue debris collect within the bladder.

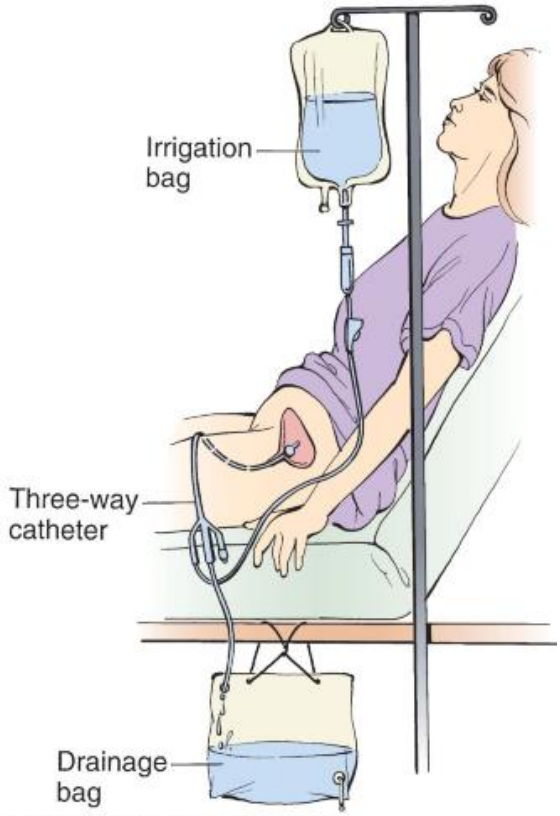


FIGURE 30-11 Bladder irrigation using a three-way catheter.

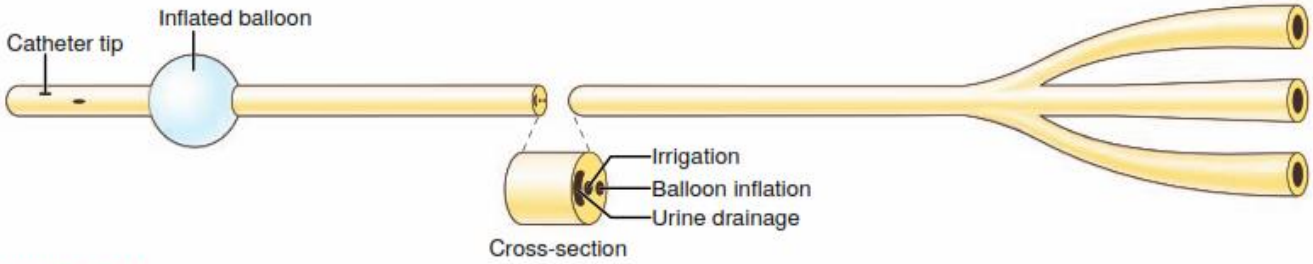
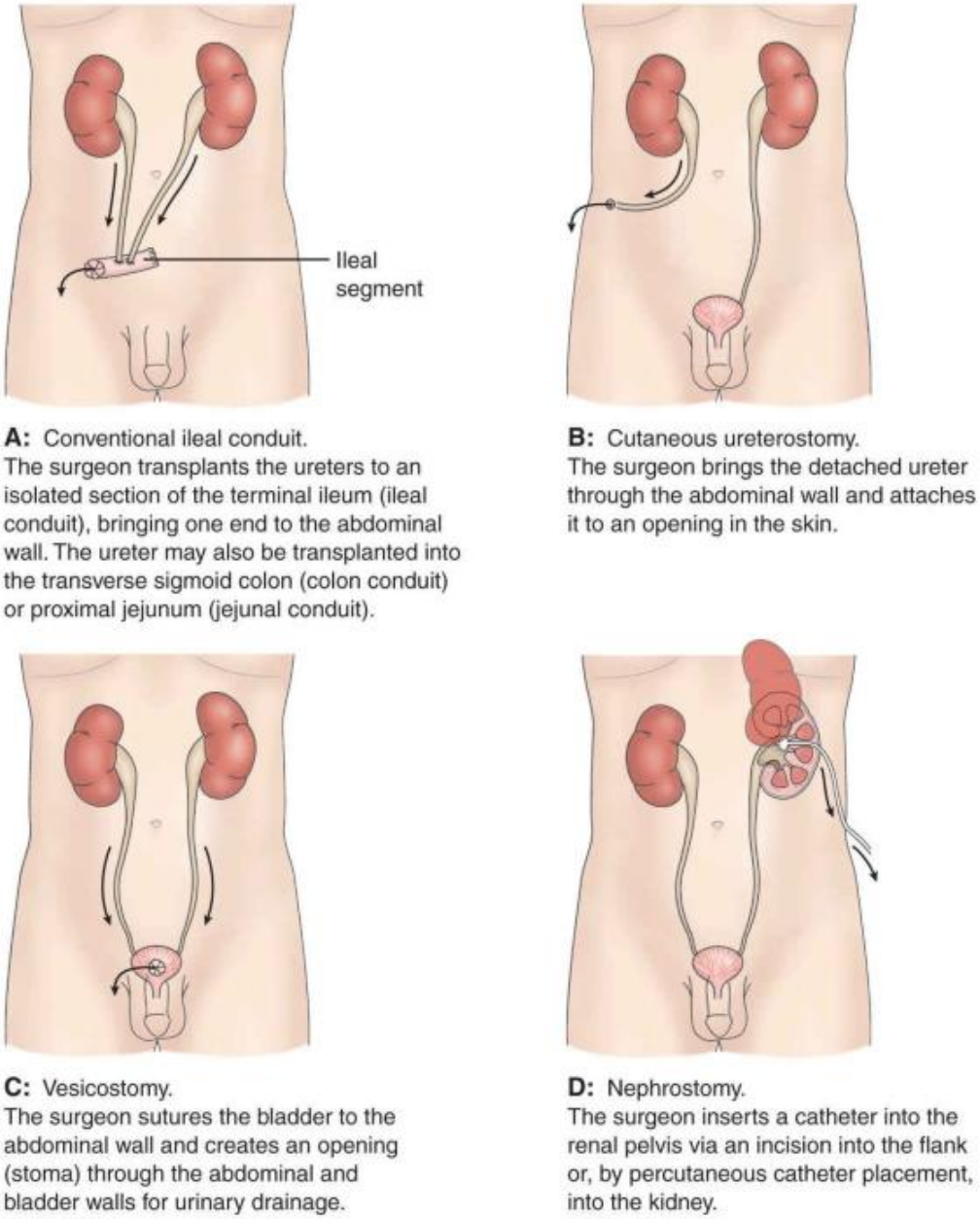


FIGURE 30-13 Components of a three-way catheter.

Urinary Diversions

■In a **urinary diversion**, one or both ureters are surgically implanted elsewhere. This procedure is done for various life-threatening conditions. The ureters may be brought to and through the skin of the abdomen. A ureterostomy (urinary diversion that discharges urine from an opening on the abdomen) SPC



A: Conventional ileal conduit. The surgeon transplants the ureters to an isolated section of the terminal ileum (ileal conduit), bringing one end to the abdominal wall. The ureter may also be transplanted into the transverse sigmoid colon (colon conduit) or proximal jejunum (jejunal conduit).

B: Cutaneous ureterostomy. The surgeon brings the detached ureter through the abdominal wall and attaches it to an opening in the skin.

C: Vesicostomy. The surgeon sutures the bladder to the abdominal wall and creates an opening (stoma) through the abdominal and bladder walls for urinary drainage.

D: Nephrostomy. The surgeon inserts a catheter into the renal pelvis via an incision into the flank or, by percutaneous catheter placement, into the kidney.

FIGURE 30-14 Examples of urinary diversions. **(A)** An ileal conduit. **(B)** A cutaneous ureterostomy. (Vesicostomy. **(D)** Nephrostomy. (From Hinkle, J. L., & Cheever, K. H. [2013]. *Brunner and Suddarth's textbook of medical-surgical nursing* [13th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins.)

Nursing Implications

- Self-Care Deficit: Toileting
- Impaired Urinary Elimination

- Risk for Infection
- Stress Urinary Incontinence
- Urge Urinary Incontinence
- Reflex Urinary Incontinence
- Total Urinary Incontinence
- Functional Urinary Incontinence
- Situational Low Self-Esteem
- Risk for Impaired Skin Integrity

Chapter 8
Bowel Elimination

Learning Objectives

On completion of this chapter, the students should be able to:

1. Describe the process of defecation.
2. Name two components of a bowel elimination assessment.
3. List five common alterations in bowel elimination.
4. Name four types of constipation.
5. Identify measures within the scope of nursing practice for treating constipation.
6. Identify two interventions that promote bowel elimination when it does not occur naturally.
7. Name two categories of enema administration.
8. List at least three common solutions used in a cleansing enema.
9. Explain the purpose of an oil retention enema.
10. Name four nursing activities involved in ostomy care.

Defecation

- **Defecation** (bowel elimination) is the act of expelling **feces** (stool) from the body. To do so, all structures of the gastrointestinal tract, especially the components of the large intestine, must function in a coordinated manner. In the large intestine, a remarkable volume of water is removed from the remnants of digestion, causing the bowel's contents to become a consolidated mass of residue before being eliminated.

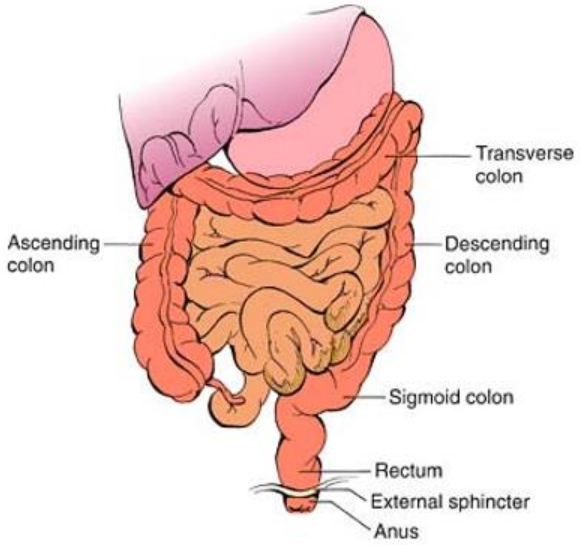


Figure 31-1• The large intestine

- **Peristalsis** means the rhythmic contractions of intestinal smooth muscle that facilitate defecation. Peristalsis moves fiber, water, and nutritional wastes along the ascending, transverse, descending, and sigmoid colon toward the rectum. Peristalsis becomes even more active during eating; this increased peristaltic activity is termed the **gastrocolic reflex**.

- The gastrocolic reflex usually precedes defecation. Its accelerated wavelike movements, sometimes perceived as slight abdominal cramping, propel stool forward, packing it within the rectum. As the rectum distends, the person feels the urge to

defecate. Stool is eventually released when the **anal sphincters** (ring-shaped bands of muscles) relax. Performing the **Valsalva maneuver** (closing the glottis and contracting the pelvic and abdominal muscles to increase abdominal pressure) facilitates this process. Several dietary, physical, social, and emotional factors can influence the bowel's mechanical function.

TABLE 31-1 Common Factors Affecting Bowel Elimination

FACTOR	EFFECT
Types of food consumed	Influence color, odor, volume, and consistency of stool, and fecal velocity
Fluid intake	Influences moisture content of stool
Drugs	Slow or speed motility
Emotions	Alter bowel motility
Neuromuscular function	Affects the ability to control rectal muscles
Abdominal muscle tone	Affects the ability to increase intra-abdominal pressure (Valsalva maneuver)
Opportunity for defecation	Inhibits or facilitates elimination

Assessment of Bowel Elimination

- **Elimination Patterns**
  - Because various elimination patterns can be normal, it is essential to determine the client's usual patterns, including frequency of elimination, effort required to expel stool, and what elimination aids, if any, he or she uses.
- **Stool Characteristics**
  - **Information that is particularly diagnostic includes stool color, odor, consistency, shape, and unusual components.**

TABLE 31-2 Characteristics of Stool

CHARACTERISTIC	NORMAL	ABNORMAL
Color	Brown	Black
		Clay colored (tan)
		Yellow
		Green
Odor	Aromatic	Foul
Consistency	Soft, formed	Soft, bulky
		Hard, dry
		Watery
		Paste like
Shape	Round, full	Unformed
		Flat
		Pencil-shaped
		Stone like
Components	Undigested fiber	Worms
		Blood
		Pus
		Mucus

Common Alterations in Bowel Elimination

- **Constipation**

  - Constipation is an elimination problem characterized by dry, hard stool that is difficult to pass. Various accompanying signs and symptoms include the following:
    - Complaints of abdominal fullness or bloating
    - Abdominal distention
    - Complaints of rectal fullness or pressure
    - Pain on defecation
    - Decreased frequency of bowel movements
    - Inability to pass stool
    - Changes in stool characteristics such as oozing liquid stool or hard small stool

- The incidence of constipation tends to be high among those whose dietary habits lack adequate fiber (such as not eating sufficient raw fruits and vegetables, whole grains, seeds, and nuts). Dietary fiber, which becomes undigested cellulose, is important because it attracts water within the bowel, resulting in bulkier stool that is more

quickly and easily eliminated.

- Constipation is classified into one of four distinct types (primary, secondary, iatrogenic, and pseudo-constipation), according to the underlying cause.

Primary Constipation

- Primary or simple constipation is well within the treatment domain of nurses. It results from lifestyle factors such as inactivity, inadequate intake of fiber, insufficient fluid intake, or ignoring the urge to defecate.

Secondary Constipation

- Secondary constipation is a consequence of a pathologic disorder such as a partial bowel obstruction. It usually resolves when the primary cause is treated.

Iatrogenic Constipation

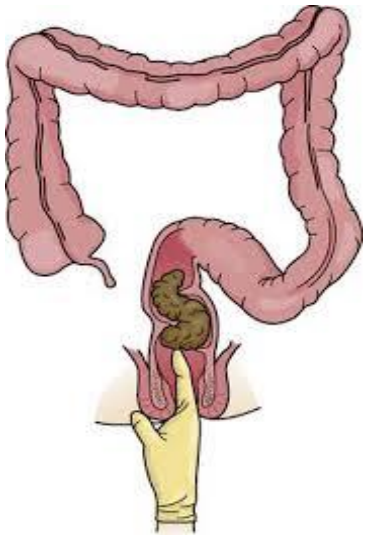
- Iatrogenic constipation occurs as a consequence of other medical treatment. For example, prolonged use of narcotic analgesia tends to cause constipation. These and other drugs slow peristalsis, delaying transit time. The longer the stool remains in the colon, the drier it becomes, making it more difficult to pass.

Pseudo-constipation

- Pseudo-constipation, also referred to as perceived constipation, is a term used when clients believe themselves to be constipated even though they are not.

Fecal Impaction

- **Fecal impaction** occurs when a large, hardened mass of stool interferes with defecation, making it impossible for the client to pass feces voluntarily. Fecal impactions result from unrelieved constipation, retained barium from an intestinal x-ray, dehydration, and weakness of abdominal muscles.



- Some clients with an impaction pass liquid stool, which they may misinterpret as diarrhea.

Flatulence

- **Flatulence** or **flatus** (excessive accumulation of intestinal gas) results from swallowing air while eating or sluggish peristalsis. Another cause is the gas that forms as a by product of bacterial fermentation in the bowel. Vegetables such as cabbage, cucumbers, and onions are commonly known for producing gas. Beans are other gas formers.

Diarrhea

- **Diarrhea** is the urgent passage of watery stool and commonly is accompanied by abdominal cramping. Simple diarrhea usually begins suddenly and lasts for a short period. Other associated signs and symptoms include nausea and vomiting and blood or mucus in the stools.

- Usually diarrhea is a means of eliminating an irritating substance such as contaminated food or intestinal pathogens. Diarrhea may also result from emotional stress, dietary indiscretions, laxative abuse, or bowel disorders.

Fecal Incontinence

- **Fecal incontinence** is the inability to control the elimination of stool.

Measures to Promote Bowel Elimination

- Nurses commonly use two interventions—inserting suppositories and administering enemas—to promote elimination when it does not occur naturally or when the bowel must be cleansed for other purposes, such as preparation for surgery and endoscopic or x-ray examinations.

Inserting a Rectal Suppository

- Medications released from the suppository can have local or systemic effects. Depending on the drug, local effects may include softening and lubricating dry stool, irritating the wall of the rectum and anal canal to stimulate smooth muscle contraction, and liberating carbon dioxide, thus increasing rectal distention and the urge to defecate.

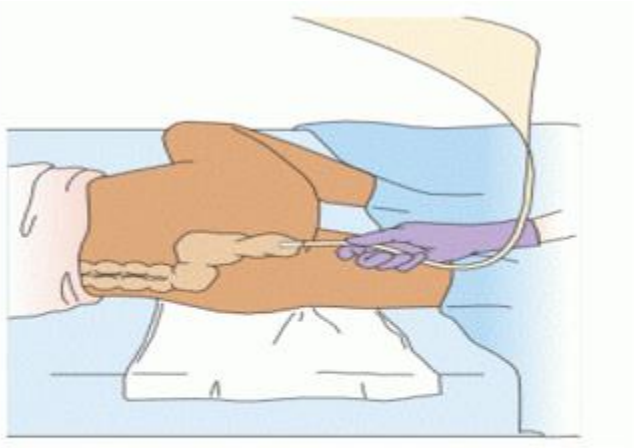
Administering an Enema

- An **enema** introduces a solution into the rectum Nurses give enemas to :
  - Cleanse the lower bowel (most common reason).
  - Soften feces.
  - Expel flatus.
  - Soothe irritated mucous membranes.
  - Outline the colon during diagnostic x-rays.
  - Treat worm and parasite infestations.

Cleansing Enemas

- Cleansing enemas use different types of solution to remove feces from the rectum.

Enema Device for bowel irrigation



The left Sims' position is used when a person is to receive an enema. This position exposes the greatest amount of the bowel to the enema solution.

TABLE 31-3 Types of Cleansing Enema Solutions

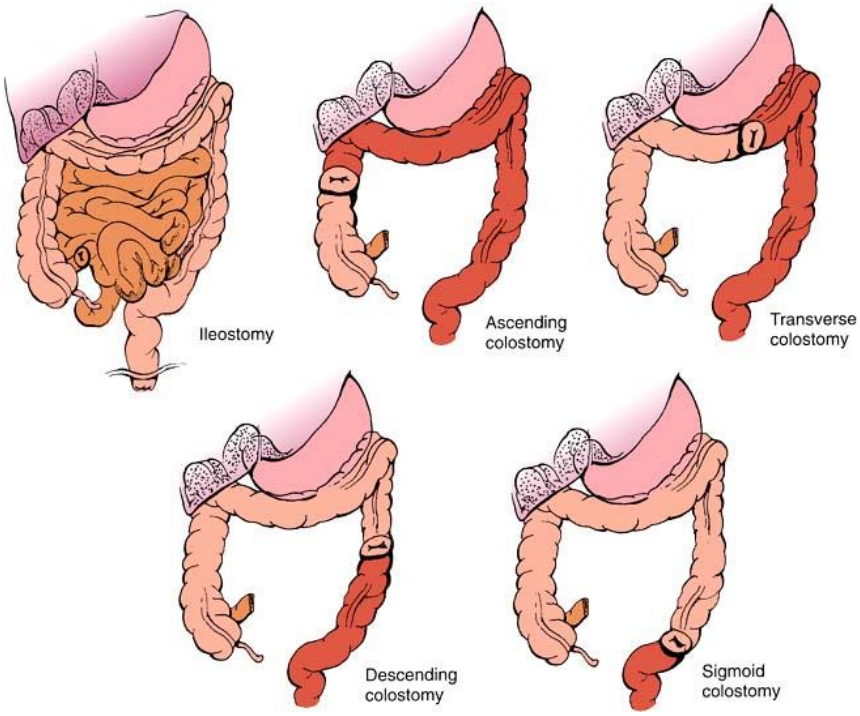
SOLUTION	AMOUNT (ml)	MECHANISM OF ACTION
Tap water	500–1,000	Distends rectum, moistens stool
Normal saline	500–1,000	Distends rectum, moistens stool
Soap and water	500–1,000	Distends rectum, moistens stool, irritates local tissue
Hypertonic saline	120	Irritates local tissue and draws water into the bowel
Mineral, olive, or cottonseed oil	120–180	Lubricates and softens stool

Retention Enemas

- A **retention enema** uses a solution held within the large intestine for a specified period, usually at least 30 minutes. Some retention enemas are not expelled at all. One type of retention enema is called an oil retention enema because the fluid instilled is mineral, cottonseed oil, or olive oil. Oils lubricate and soften the stool, so it can be expelled more easily.

Ostomy Care

- A client with an **ostomy** (surgically created opening to the bowel or other structure; requires additional care for promoting bowel elimination. Two examples of intestinal ostomies are an **ileostomy** (surgically created opening to the ileum) and a **colostomy** (surgically created opening to a portion of the colon; Fig. 31-4). Materials enter and exit through a **stoma** (entrance to the opening).



- Most persons with an ostomy, also called ostomates, wear an **appliance** (bag or collection device over the stoma) to collect stool. Depending on the type and location of the ostomy, client care may involve providing peristomal care, applying an appliance, draining a continent ileostomy, and, for clients with a colostomy, administering irrigations through the stoma.

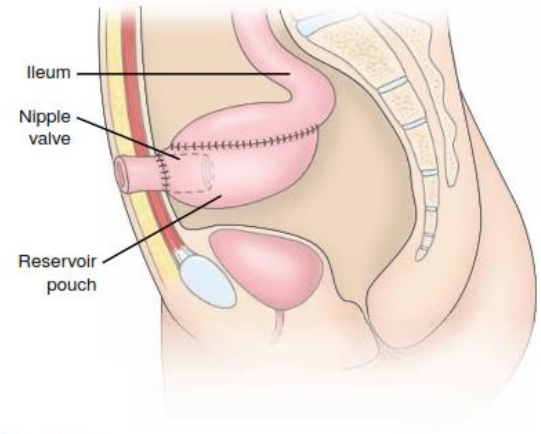


FIGURE 31-6 A continent ileostomy.

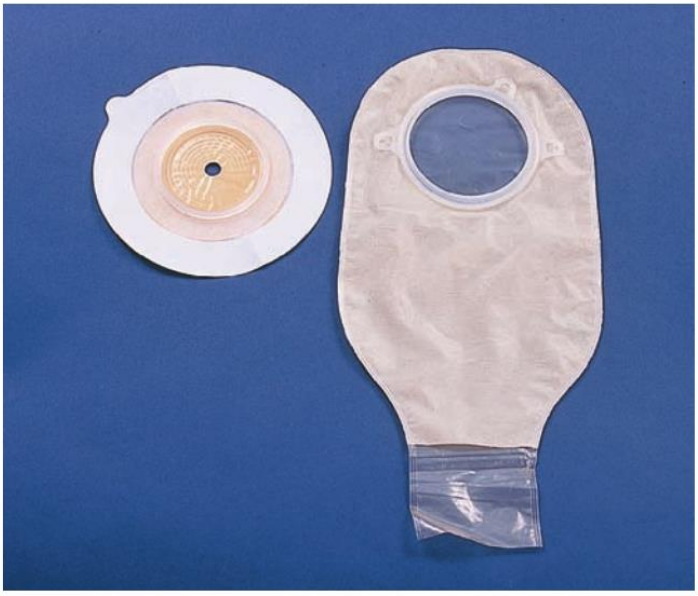


FIGURE 31-5 An ostomy appliance: a faceplate and pouch. (Photo by B. Proud.)

Providing Peristomal Care

- Preventing skin breakdown is a major challenge in ostomy care. Enzymes in stool can quickly cause **excoriation** (chemical injury of skin). Washing the stoma and surrounding skin with mild soap and water and patting it dry can preserve skin integrity.

Client and Family Teaching 31-2
Draining a Continent Ileostomy

The nurse teaches the client and the family as follows:

- Assume a sitting position.
- Insert a lubricated 22- to 28-F catheter into the stoma.
- Expect resistance after inserting the tube approximately 2 in.; this is the location of the valve that controls the retention of liquid stool or urine.
- Gently advance the catheter through the valve at the end of exhalation, while coughing, or while bearing down as if to pass stool.
- Lower the external end of the catheter at least 12 in. below the stoma.
- Direct the end of the catheter into a container or toilet as stool or urine begins to flow.
- Allow at least 5 to 10 minutes for complete emptying.
- Remove the catheter and clean it with warm soapy water.
- Place the clean catheter in a sealable plastic bag until its next use.
- Cover the stoma with a gauze square or a large bandage.
- If the catheter becomes plugged with stool or mucus:
  - Bear down as if to have a bowel movement.
  - Rotate the catheter tip inside the stoma.
  - Milk the catheter.
  - If these are not successful, remove the catheter, rinse it, and try again.
  - Notify the physician if these efforts do not result in drainage.
- Never wait longer than 6 hours without obtaining drainage.

Nursing Implications

- Constipation
- Risk for Constipation
- Perceived Constipation
- Diarrhea
- Bowel Incontinence
- Toileting Self-Care Deficit
- Situational Low Self-Esteem

Chapter 9
Medication Administration

Oral Medications

Learning Objectives

On completion of this chapter, the students should be able to:

1. Define the term medication.
2. Name seven components of a drug order.
3. Explain the difference between trade and generic drug names.
4. Name four common routes for administration.
5. Describe the oral route and two general forms of medication administered this way.
6. Explain the purpose of a medication record.
7. Name three ways that drugs are supplied.
8. Discuss two nursing responsibilities that apply to the administration of narcotics.
9. Name the five rights of medication administration.
10. Give the formula for calculating a drug dose.
11. Discuss at least one guideline that applies to the safe administration of medications.
12. Discuss one point to stress when teaching clients about taking medications.
13. Explain the circumstances involved in giving oral medications by an enteral tube and one commonly associated problem.
14. Describe three appropriate actions in the event of a medication error.

Nurses and Medication

One of the nurse's most important responsibilities is the administration of medications.

- **medications** (chemical substances that change body function).
- This chapter emphasizes the safe preparation and administration of medications particularly those given by the oral route.

Medication Orders

- **A medication order** is a lists of drugs names and directions for its administration. Usually physicians or dentists write a medication order.

Other medical personnel, such as a physician's assistant or an advanced practice nurse, also can write medication orders if legally designated to do so by state statutes.

Medication orders written on the client's medical record are used here for the purposes of discussion.

Components of a Medication Order

All medication orders must have seven components:

- Client's name
- Date and time the order is written
- Drug name
- Dose to be administered
- Route of administration
- Frequency of administration
- Signature of the person ordering the drug

- **Nursing Alert**

If any one of these components is absent, the nurse must withhold the drug until he or she has obtained the missing information. Medication errors are serious.

Drug Name

Each drug has a Three different Names

- **Chemical Name :** is a precise description of the drug's chemical composition and molecular structure.
- **Trade name** (the name by which a pharmaceutical company identifies its drug) A trade name is sometimes called a brand or proprietary name.
- **Generic name** (This is a name which appears in officials nationals pharmacopeias, generic name can vary according to pharmacopeias)

for example

  - Nor epinephrine or levarterenol in USP is Nor adrenaline in BP
  - Furosemide in the USP is Frusemide in the BP.
- **Examples of the three names of drugs**
  - N-4-hydroxyphenyle acetamide.. (Chemical name)
  - Acetaminophen in USP, Paracetamol in BP (Generic name)
  - Acamol, Tylenol, Dexamol …… (Trade names)
- **Drug Dose:** The dose means the amount of drug to administer and is prescribed using the metric system. Some drugs are also prescribed in units, milliunits, international units, and milliequivalents (mEq)
- **Route of Administration:** The route of administration means how the drug is given, which may be by an oral, topical, inhalant, parenteral (ID, SQ, IM), or Intravenous (IV) route
- **The oral route** (administration of drugs by swallowing or instillation through an enteral tube) facilitates drug absorption through the gastrointestinal tract. It is the most common route for medication administration because it is safer, more economical, and more comfortable than others. Medications administered by the oral route come in both solid and liquid forms.

- **Solid medications** include tablets and capsules
- **Scored tablet** (a solid drug manufactured with a groove in the center)
- **Enteric coated tablets** (a solid drug covered with a substance that dissolves beyond the stomach)
- **sustained release** (a drug that dissolves at timed intervals).

2. Liquid forms of oral drugs include syrups, elixirs, and suspensions.

Frequency of Administration

- The frequency of drug administration refers to how often and how regularly the medication is to be given.
- Frequency of administration is written using standard abbreviations of Latin origin. Some common examples include the following:

Abb.	Meaning	Abb.	Meaning
Stat	immediately	q.h.	hourly
b.i.d.	twice a day	q4h	every 4 hours
t.i.d.	three times a day	p.r.n.	as needed
q.i.d.	four times a day	s.o.s.	if needed

Verbal and Telephone Orders

- Verbal orders are instructions for client care that are given during face-to-face conversations. Telephone orders are obtained from a physician during a telephone conversation.
- When obtaining phone orders, it is important to repeat the dosages of drugs and to spell drug names for confirmation of accuracy. Some nurses ask a second nurse to listen to a telephone order on an extension.
- The person who prescribed the medication must sign the verbal or telephone order within 48 hours or according to the agency's policy.

Documentation in the Medication

Administration Record

Once the nurse has obtained the medication order, he or she transcribes it to the medication administration record (MAR; agency form used to document drug administration). Use of the MAR ensures timely and safe medication administration.

- The MAR usually kept separate from the client's medical record, but it eventually becomes a permanent part of it.

METHODS OF SUPPLYING MEDICATIONS

- After transcribing the medication order to the Kardex, the nurse requests the drug from the pharmacy with either a paper or a facsimile (fax) transmission request.
- Drugs are supplied, or dispensed, in three major ways.

- **An individual supply** is a container with enough of the prescribed drug for several days or weeks, which is common in long-term care facilities such as nursing homes
- **A unit dose supply** (a self-contained packet that holds one tablet or capsule) is most common in acute care hospitals that stock drugs for individual clients several times in 1 day.
- **A stock supply** (stored drugs) remains on the nursing unit for use in an emergency so that a nurse can give a drug without delay.

Storing Medications

- Each health agency has one area for storing drugs. Some agencies keep medications in a mobile cart; others store them in a medication room.

Accounting for Narcotics

- Health agencies keep narcotics in a double-locked drawer, box, or room on the nursing unit. Because narcotics usually are delivered by stock supply, nurses are responsible for an accurate account of their use.
- Nurses count narcotics at each change of shift.

Medication Administration

- Safety is the main concern in medication administration. Taking various precautions before, during, and after each administration reduces the potential for medication errors. Some precautions include ensuring the five rights of medication administration, calculating drug dosages accurately, preparing medications carefully, and recording their administration.

Applying the Five Rights

- To safeguard against medication errors, nurses follow the five rights of medication administration. Some nurses have added a sixth right, the right to refuse.
- five rights of medication are:
- Right Drug
- Right Dose
- Right Route
- Right Time
- Right Client

Calculating Dosages

- One of the major nursing responsibilities, and one of the five rights, is preparing the dose accurately. [Right Dose]
- **Drug Calculation Formula**

BOX 32-1 Drug Calculation Formula

$$\frac{D}{H} \cdot Q = \frac{\text{Desired dose}}{\text{Dose on hand (supplied dose)}} \cdot \text{Quantity} = \text{Amount to administer}$$

Example

Drug order: Tetracycline 500 mg (desired dose) by mouth q.i.d.
Dose supplied: 250 mg (*dose on hand*) per 5 mL (*quantity*)

$$\text{Calculation: } \frac{500 \text{ mg}}{250 \text{ mg}} \cdot 5 \text{ mL} = 10 \text{ mL}$$

Administering Oral Medications

- Nurses prepare and bring oral medications to the client's bedside in a paper or plastic cup . The nurse administers only those medications that he or she has personally prepared; never administer medications pre-pared by another nurse.
- If a client is not on the unit at the time of medication administration, the nurse returns the medications to the medication cart or room. Leaving medications unattended may result in their loss or accidental ingestion by someone else.

Preparing Oral Medications Safely

- Prepare medications under well-lit conditions. Light improves the ability to read labels accurately.
- Work alone without interruptions and distractions. This promotes concentration.
- Check the label of the drug container three times: (1) when reaching for the medication, (2) just before placing the medication into an administration cup, and (3) when returning the medication to the client’s drawer. Checking ensures attention to important information.

Preparing Oral Medications Safely cont.

- Avoid using medications from containers with a missing or obliterated label. This eliminates speculating on the drug name or dose.
- Return medications with dubious or obscured labels to the pharmacy. This step facilitates replacement or new labeling.
- Never transfer medications from one container to another. Such transfers could lead to mismatching contents.
- Check the expiration dates on liquid medications. Doing so ensures administration at desired potency.
- Inspect the medication and reject any that appear to be decomposing. These steps promote appropriate absorption.

Administering Oral Medications by Enteral Tube

- When a client cannot swallow oral medications, they can be instilled by enteral tube.
- After administering the drug, the nurse clamps or plugs the tube for at least 30 minutes to prevent removing the drug before it leaves the stomach.
- Nurses can give medications while a client is receiving tube feedings, but they instill the medications separately—that is, they do not add the medications to the formula.

Preparing Medications for Enteral Tube Administration

- Use the liquid form of the drug whenever possible. It promotes tube patency.
- Add 15–60 mL of water to thick liquid medications. Water dilutes the medication and facilitates instillation.
- Pulverize tablets except those that are enteric coated. Pulverizing creates small granules that may instill more readily.
- Open the shell of a capsule to release the powdered drug. This step facilitates mixing into a liquid form.
- Avoid crushing sustained-release pellets. Keeping them whole ensures their sequential rate of absorption.

Preparing Medications for Enteral Tube Administration cont.

- Mix each drug separately with at least 15–30 mL of water. Water provides a medium and dilute volume for administration.
- Use warm water when mixing powdered drugs. It promotes dissolving the solid form.
- Pierce the end of a sealed gelatin capsule and squeeze out the liquid medication, or aspirate it with a needle and syringe. These measures facilitate access to the medication.
- As an alternative, soak a soft gelatin capsule in 15–30 mL of warm water for approximately 1 hour. Soaking dissolves the gelatin seal.

Preparing Medications for Enteral Tube Administration cont.

- Avoid administering bulk-forming laxatives through an enteral tube. Such laxatives

could obstruct the tube.

- Interrupt a tube feeding for 15–30 minutes before and after administration of a drug that should be given on an empty stomach. Doing so facilitates the drug's therapeutic action or its absorption.
- Clamp a nasogastric tube that is being used to suction gastric secretions for 30 minutes after administering medication. Keeping the tubing temporarily clamped allows time for the medication to move beyond the stomach and be absorbed.

Documentation

- Nurses document medication administration on the MAR, the client's chart, or both as soon as possible. Timely documentation prevents medication errors

Medication Errors

- Medication errors happen too often. When errors occur, nurses have an ethical and legal responsibility to report them to maintain the client's safety.
- As soon as he or she recognizes an error, the nurse checks the client's condition and reports the mistake to the prescriber and supervising nurse immediately. Health care agencies have a form for reporting medication errors called an incident sheet [incident report] or accident sheet

Nursing Implications

Nursing Diagnosis

- Deficient Knowledge
- Risk for Aspiration
- Ineffective Therapeutic Regimen Management
- Ineffective Health Maintenance
- Noncompliance

Chapter 10
Topical and Inhalant Medications

Learning Objectives

On completion of this chapter, the students should be able to:

1. Explain how topical medications are administered and commonly applied.
2. Name two forms of drugs applied by the transdermal route and principles to follow when applying a skin patch.
3. Name two forms of drugs applied by the transdermal route and principles to follow when applying a skin patch.
4. Describe where eye medications are applied.
5. Explain how the administration of ear medications differs for adults and children.
6. Explain the rebound effect that accompanies the administration of nasal decongestants.
7. Describe the difference between sublingual and buccal administration.
8. Name a common reason for vaginal applications.
9. Give the form of medication used most often for rectal administration.
10. Explain why inhalation is a good route for medication administration.
11. Name two types of inhalers and alternatives for administering inhaled medications.

Topical Route

- Drugs given by the topical route (the administration of medications to the skin or mucous membranes) can be applied externally or internally
- Topically applied drugs have a local or systemic effect.
- Many are administered to achieve a direct effect on the tissue to which they are applied.

- **Percutaneous Applications**

Percutaneous applications are drugs rubbed into or placed in contact with the skin. They include Ointments, patches and pastes.

1. Ointment Application

An ointment is a is a topical preparation rubbed into the skin for administration of a medication (also called oils, lotions, and creams) Alert clients may self-administer an ointment after receiving proper instruction.

TABLE 33-1 Topical Medications

ROUTES	LOCATION	VEHICLE	EXAMPLES
Cutaneous	Skin	Ointment	hydrocortisone (Cortaid)
	Skin	Cream	benzocaine (Lanacane)
	Scalp	Liquid	permethrin (Nix)
	Skin	Lotion	Lubriderm[a]
	Skin	Patch	estrogen (Estraderm)
	Skin	Paste	nitroglycerin (Nitrol)
	Oral mucous membrane	Gel	benzocaine (Anbesol)
Ophthalmic	In the eye	Drops	timolol (Timoptic)
		Ointment	polymyxin, neomycin, bacitracin (Neosporin)
Otic	In the ear	Drops	hydrocortisone, neomycin, polymyxin (Cortisporin Otic)
		Irrigation	carbamide peroxide (Debrox)
Nasal	In the nose	Spray	oxymetazoline (Afrin)
		Drops	oxymetazoline (Neo-Synephrine)
Sublingual	Under the tongue	Tablet	nitroglycerin (Nitrostat)
		Spray	nitroglycerin (Nitrolingual)
Buccal	Between the cheek and gum	Tablet	nitroglycerin (Nitrogard)
		Lozenge	Cepacol[a]
Vaginal	In the vagina	Douche	povidone iodine (Massengill medicated douche)
		Cream	clotrimazole (Gyne-Lotrimin)
		Suppository	fluconazole (Monistat)
Rectal	To or within rectum	Irrigation	sodium phosphate (Fleet Enema)
		Suppository	bisacodyl (Dulcolax)
		Ointment	hydrocortisone (Anusol)

[a]Indicates a nonprescription item that is a combination of ingredients.

2. Transdermal Applications

A transdermal application refers to drugs that are applied to and absorbed through the skin. Examples include skin patches and pastes.

- **Skin Patches:**

are drugs bonded to an adhesive bandage and applied to the skin for systemic distribution, When applied the patch stays in place for a number of hours and the drug migrates through the skin, being absorbed to maintain a consistent drug level in the bloodstream. Transdermal patches are typically applied to the upper body such as the chest, buttock, stomach, and upper arms. The patch is marked with date and time of administration, and the location is documented in the (MAR).

Each time a new patch is applied, it is placed in a slightly
different location.

After application of the patch, it may take approximately 30 minutes to 8 hours for the drug to reach a therapeutic level.

Examples for skin Patches:

- scopolamine, a drug used to prevent motion sickness.
- fentanyl patches that are 100 times the strength of morphine are used around the clock.
- A nitroglycerin patch that is used to prevent and relieve chest pain is used for 12 to 14 hours, then removed for the same amount of time.

- **Drug Paste:**
- A paste contains a drug within a thick base and is applied to but not rubbed into the skin. Nitroglycerin can be applied as a paste. Although sometimes the product is referred to as ***an ointment***, the term is a misnomer because the skin is not massaged once the drug is applied.
- Nitroglycerin paste has a shorter duration of action than that supplied in a transdermal patch. Consequently, it must be applied more frequently to provide a sustained effect.

- **Ophthalmic Applications:** An ophthalmic application is a method of applying drugs onto the mucous membrane of one or both eyes, The mucous membrane of the eyes is called the conjunctiva. It lines the inner eyelids and the anterior surface of the sclera, Ophthalmic medications are supplied either in liquid form and instilled as drops, or as ointments applied along the lower lid margin.

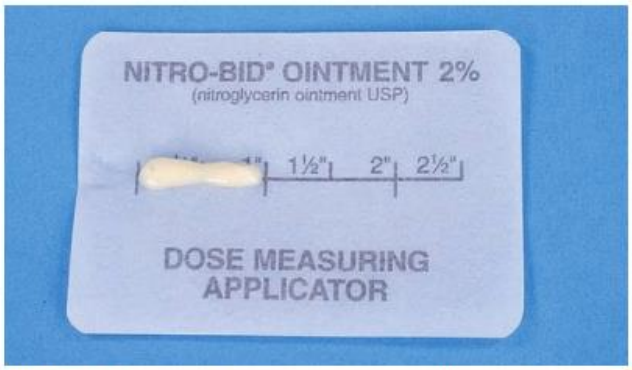


FIGURE 33-2 A paste and applicator paper. (Photo by B. Proud.)

FIGURE 33-3 Ophthalmic application sites. (Photo by B. Proud.)

- **Otic Applications:** An Otic application is a drug instilled in the outer ear. It is usually administered to moisten impacted cerumen or to instill medications to treat a local bacterial or fungal infection. When instilling ear medication, the nurse first manipulates the ear to straighten the auditory canal. The technique varies depending on whether the client is
- In a young child. the nurse pulls the ear down and back.
- But in an adult the nurse pulls the ear up and back.

Tilting the client's head away, the nurse instills the prescribed number of drops of medication within the ear. The client remains in this position briefly as the solution travels toward the eardrum. The nurse can place a small cotton ball loosely in the ear to absorb excess medication. If a bilateral administration is prescribed, the nurse waits at least 15 minutes before instilling medication in the opposite ear. Briefly postponing the application within the second ear avoids displacing the initially instilled medication when repositioning the client

- **Nasal Applications**

Topical medications are dropped or sprayed within the nose. A proper instillation is important to avoid displacing the medication into nearby structures such as the back of the throat. Adults often self administer their own nasal medications, but sometimes nurses must assist older adults and children.

- **Sublingual and Buccal Applications**

sublingual application: a drug placed under the tongue and is left to dissolve slowly and becomes absorbed by the rich blood supply in the area. Some drugs in spray form also are administered sublingually.

buccal application: a drug placed against the mucous membranes of the inner cheek is another method of drug administration. When giving sublingual or buccal administrations, nurses instruct clients not to chew or swallow the medication. Eating and smoking also are contraindicated during the brief time needed for a solid medication to dissolve.

- **Vaginal Applications**

Topical vaginal applications are used most often to treat local infections, which are common and usually result from the colonization of vaginal tissue by microorganisms. The microorganisms usually get transferred during bowel elimination if the client wipes stool from the rectal area toward (not away from) the vagina. Symptoms of a yeast infection include intense vaginal itching and a white, cheese-like vaginal discharge. Several nonprescription drugs useful in treating vaginal yeast infections are available in suppository, dissolvable tablet, and cream form.

- **Administering Medications Vaginally**

The nurse teaches the client as follows:

- Plan to instill the medication before going to bed so that it can be retained for a prolonged period.
- Empty the bladder just before inserting the medication.
- Place the drug in the applicator.
- Lubricate the applicator tip with a water-soluble lubricant such as K-Y Jelly.
- Lie down, bend your knees, and spread your legs.
- Separate the labia and insert the applicator into the vagina to the length recommended

in the package directions, usually 2–4 in. (5–10 cm).

- Depress the plunger once it reaches the proper distance within the vagina to insert the medication.
- Remove the applicator and place it on a clean tissue.
- Apply a sanitary pad if you prefer.
- Remain recumbent for at least 10–30 minutes.
- Discard the applicator if it is disposable. Wash a reusable applicator with soap and water when you wash your hands.
- Consult a physician if symptoms persist.

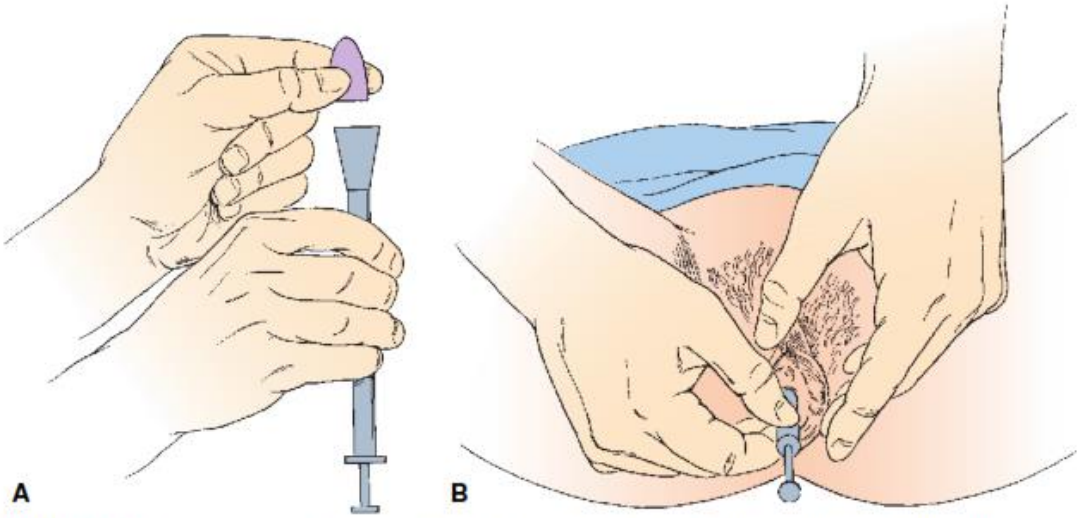


FIGURE 33-4 Administering drugs vaginally. **A.** Placing the drug in the applicator. **B.** Inserting the applicator with the drug.

NOTE:

If the client cannot self-administer a vaginal medication, the nurse wears gloves to avoid contact with secretions. After removing the gloves, hand washing or an alcohol-based hand rub is critical. The same advice holds true for rectal applications.

- **Rectal Applications**

Drugs administered rectally are usually in the form of suppositories, creams and ointments

also may be prescribed.

The technique for using a rectal applicator is similar to that for using a vaginal applicator.

- **Inhalant Route**

The inhalant route administers drugs to the lower airways. This method of medication administration is effective because the lungs provide an extensive area from which the circulatory system can quickly absorb the drug.

There are two types of inhalers:

- **Dry powder inhaler:** holds a reservoir of pulverized drug and a carrier substance,
- **Metered-dose inhaler:** that delivers aerosolized medication, which is a liquid drug forced through a narrow channel via a chemical propellant

NOTE:

Some clients, such as infants, young children, and older adults, who have difficulty coordinating inspiration with the use of a hand held inhaler, may use **a nebulizer** as an alternative

to administering an inhalant. A nebulizer, sometimes called a "breathing machine," is a device that converts liquid medication to an aerosol using compressed air. The aerosol is inhaled through a mouthpiece or a face mask over 10 to 20 minutes

FIGURE 33-6 A metered-dose inhaler can be used by holding the mouthpiece 1 to 2 in. away prior to depressing the canister and inhaling, or the mouthpiece can be placed in the mouth and sealed by the lips prior to administering the drug.

FIGURE 33-7 Using a metered-dose inhaler with a spacer.

FIGURE 33-10 A nebulizer consists of a cup to which liquid medication is added, a mouthpiece, and tubing that connects to an electric or a battery-operated source for compressed air.

- **Nursing Implications**

Nursing Diagnosis

- Deficient Knowledge; Readiness for Enhanced Knowledge
- Ineffective Self-Help Management
- Impaired Gas Exchange
- Impaired Skin Integrity
- Impaired Tissue Integrity
- Ineffective Breathing Patterns

Chapter 11

Parenteral Medications

Learning Objectives

On completion of this chapter, the students should be able to:

1. Name three parts of a syringe.
2. List five factors to consider when selecting a syringe and needle.
3. Explain the rationale for redesigning conventional syringes and needles.
4. Name three ways that pharmaceutical companies prepare parenteral drugs.
5. Discuss an appropriate action before combining two drugs in a single syringe.
6. List four injection routes.
7. Identify common sites for intradermal, subcutaneous, and intramuscular injections.
8. Name a type of syringe commonly used to administer an intradermal, subcutaneous, and intramuscular injection.
9. Describe the angles of entry for intradermal, subcutaneous, and intramuscular injections.

Parenteral Route

The parenteral route means a route of drug administration by injection.

- **Parenteral Administration Equipment:**

The major equipment used to administer parenteral drugs consists of a syringe and a needle. Numerous types of syringes and needles are available.

- **Syringes:**
- All syringes contain **a barrel** (the part of the syringe that holds the medication), **a plunger** (the part of the syringe within the barrel that moves back and forth to withdraw and instill the medication), and **a tip or hub** (the part of the syringe to which the needle is attached).
- Syringes are calibrated in milliliters (mL) or cubic centimeters (cc), and units (U).

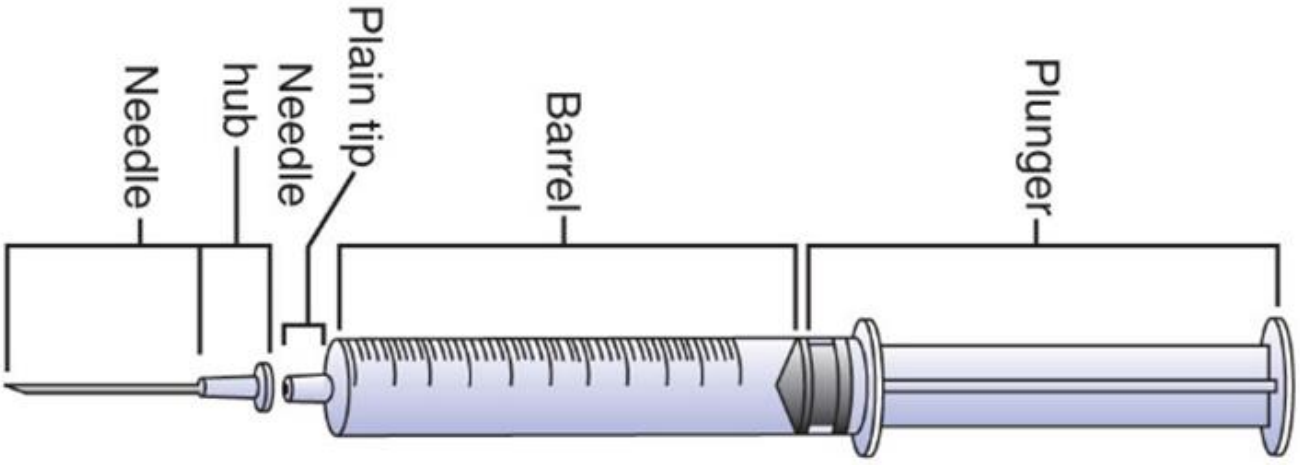


FIGURE 34-1 The parts of a syringe. (From Rosdahl, C. B., & Kowalski, M. T. [2012]. *Textbook of basic nursing* [10th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins [PE].)

- **Needles**
- Needles are supplied in various lengths and gauges. The **shaft** (the length of the needle) depends on the depth to which the medication will be instilled. Needle lengths vary from approximately **1⁄2** to 2**1⁄2** in. The tip of the shaft is **beveled, or slanted,** to

pierce the skin more easily,.

- Filter needles that provide a barrier for glass particles are available when withdrawing medication from a glass ampule.
- The needle **gauge** (diameter) refers to its width. For most injections, 18- to 27-gauge needles are used; the smaller the number, the larger the diameter. For example, an 18-gauge needle is wider than a 27-gauge needle. A wider diameter provides a larger lumen, or opening, through which drugs are administered into the tissue.

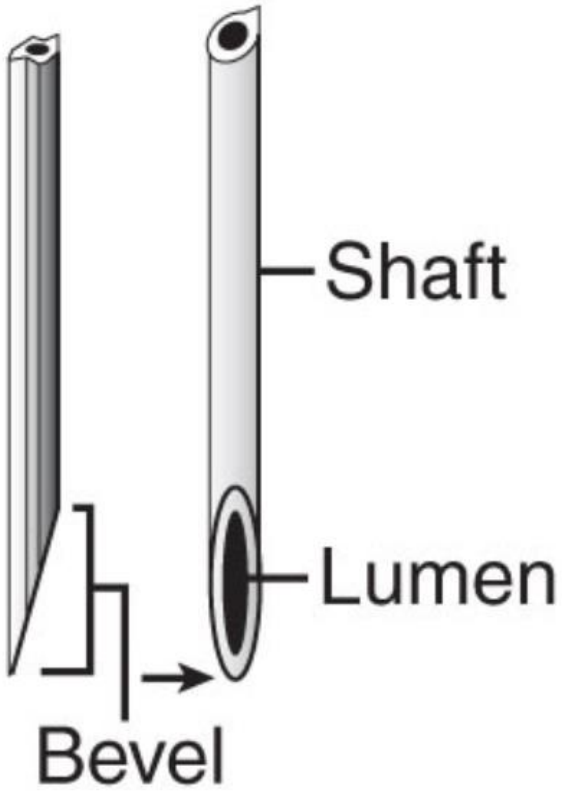


FIGURE 34-3 Parts of injection needle. (From Rosdahl, C. B., & Kowalski, M. T. [2012]. *Textbook of basic nursing* [10th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins [PE].)

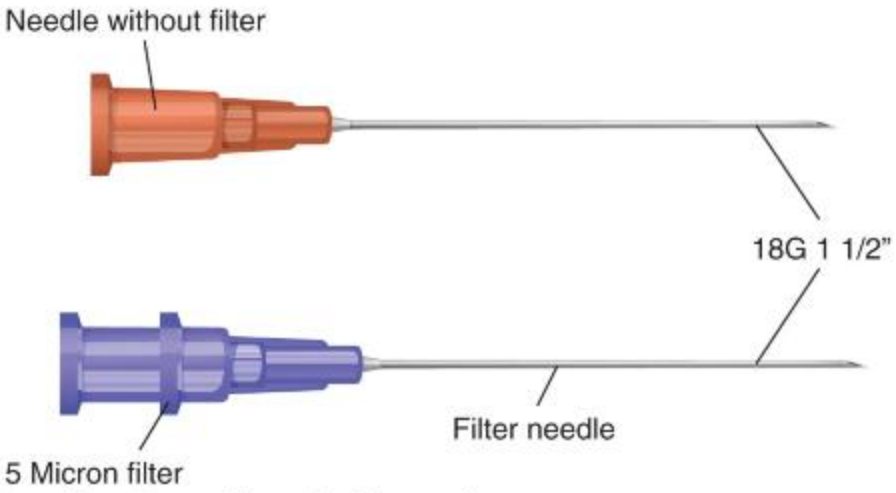


FIGURE 34-4 A needle without a filter and a filter needle.

- **Several factors are considered when selecting a syringe and needle:**
- The type of medication
- The depth of tissue
- The volume of prescribed drug
- The viscosity of the drug
- The size of the client

- **Modified Safety Injection Equipment**

Conventional syringes and needles are being redesigned to avoid needlestick injuries and, thus, to reduce the risk of acquiring a blood-borne viral disease such as hepatitis or AIDS. Currently, **there are three different safety injection devices:**

- those with plastic shields that cover the needle after its use,
- those with needles that retract into the syringe, and
- gas-pressured devices that inject medications without needles. Most health agencies already are using

one or several types of modified equipment to enclose or cover the needle.

If modified safety injection devices are not available, two techniques are used with standard equipment to prevent needlestick injuries. Before administering an injection, the protective cap covering a needle is replaced by using the:

scoop method (the technique of threading the needle within the cap without touching the cap itself).

After administering an injection, the needle is left uncapped and deposited in the nearest biohazard container, which is usually at the client's bedside.

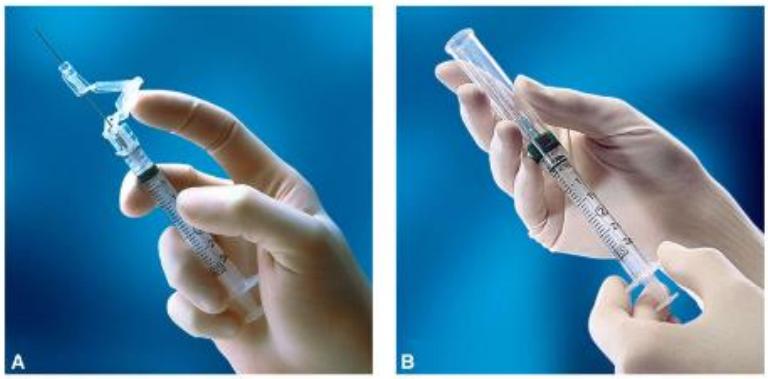


FIGURE 34-5 Safety injection devices. **(A)** A syringe with an articulated levered shield that glides over the needle after it is used. **(B)** A syringe with a circular sleeve that covers the needle. (Courtesy of Smiths Medical North America. JELCO, Needle-Pro is a trademark of Smiths Medical Family of Companies. All Rights Reserved.)

FIGURE 34-6 The scoop method for covering a needle. (Photo by B. Proud.)

Should an accidental injury occur, health care workers should follow these recommendations:

- Report the injury to a supervisor.
- Document the injury in writing.
- Identify the client if possible.
- Obtain HIV and hepatitis B virus client status results,
- Obtain counseling on the potential for infection.
- Receive the most appropriate post exposure drug treatment prophylaxis.
- Be tested for the presence of antibodies at appropriate intervals.

- Monitor for potential symptoms and obtain a medical follow-up.

Drug Preparation

Drug preparation involves withdrawing medication from an ampule or vial or assembling a prefilled syringe cartridge

- **Ampules**

An ampule (a sealed glass drug container) must be broken to withdraw the medication (see Nursing Guidelines

- **Vials**

A vial (a glass or plastic container of parenteral medication with a self-sealing rubber stopper) must be pierced with a needle or a needleless adapter to remove medication.

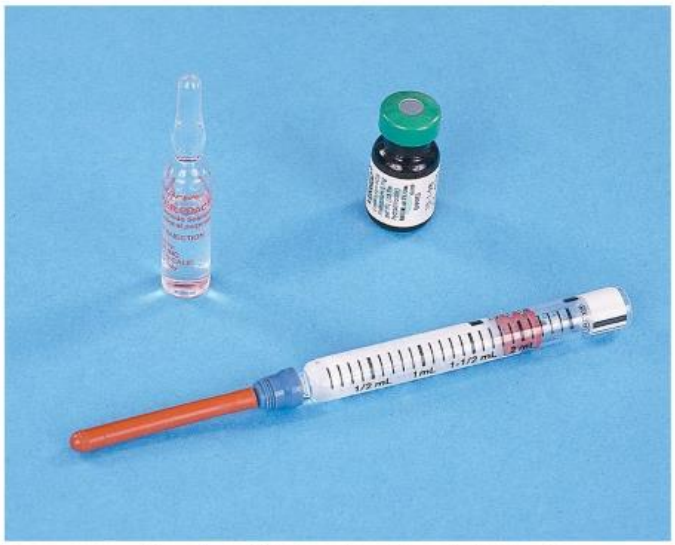


FIGURE 34-8 An ampule, a vial, and a prefilled cartridge. (Photo by B. Proud.)

Withdrawing Medication from an Ampule

- Select an appropriate syringe and filter needle. Proper equipment ensures appropriate drug administration and prevents aspirating glass particles within the barrel of the syringe.
- Tap the top of the ampule. Tapping distributes all the medication to the lower portion of the ampule.

- Protect your thumb and fingers with a gauze square or alcohol swab. These devices reduce the potential for injury.
- Snap the neck of the ampule away from your body. Doing so avoids accidental injury.
- Insert the filter needle into the ampule. Avoid touching the outside of the ampule. These methods ensure sterility of the needle.
- Invert the ampule Inversion facilitates withdrawing the medication.
- Pull back on the plunger. This step fills the syringe.
- Remove the needle from the ampule when the volume has been withdrawn. This prepares for drug administration.
- Tap the barrel of the syringe near the hub. Tapping moves air toward the needle.
- Push carefully on the plunger. Pushing expels air or excess medication.
- Empty the unused portion of medication from the syringe. Doing so prevents illegal drug use.
- Discard the glass ampule in a puncture-resistant container. Proper disposal prevents accidental injury.

- Remove the filter needle and attach a sterile needle for administering the injection. These techniques prevent injecting glass particles into the client.
- Scoop the needle within its protective cap or extend a guard that recesses the needle. These measures reduce the risk of a needle stick injury.

Withdrawing Medication from a Vial

- Select an appropriate syringe and needle. The correct equipment ensures appropriate drug administration.
- Remove the metal cover from the rubber stopper. This step. facilitates inserting the needle or needleless adaptor.
- Clean a preopened vial with an alcohol swab. Alcohol swabs remove colonizing

microorganisms.

- Fill the syringe with a volume of air equal to the volume that will be withdrawn from the vial. This step provides a means for increasing pressure within the vial.
- Pierce the rubber stopper with the needle or tip of a needleless syringe and instill the air. Doing so facilitates the withdrawal of the drug.
- Invert the vial, hold, and brace it while pulling on the plunger This step locates medication near the tip of the needle or needleless adaptor to facilitate its withdrawal.
- Remove the needle or adaptor when the desired volume has entered the barrel of the syringe. Doing so leaves the remaining drug for additional administrations.
- If the medication is a controlled substance such as a narcotic, aspirate the entire contents from the vial. Full aspiration prevents illegal drug use.

- Discard any excess medication; if the drug is a narcotic, have someone witness this action. These measures comply with federal laws to prevent illegal drug use.
- Cover the needle or needleless adaptor and care for the used supplies as described in the guidelines for withdrawing from an ampule Nurses follow aseptic and safety principles.
- Date and initial the vial if the remaining drug will be used in the near future. Doing so supports the principles of asepsis.

The amount of drug in a vial may be enough for one or multiple doses. Any unused drug is dated before it is stored for future use.

Usually, drugs in vials are in liquid form, but sometimes they are supplied as powders that must be dissolved.

Reconstitution (the process of adding liquid, known as diluent, to the powder substance. Common diluents for injectable drugs are **sterile water or sterile NS.**

Note:

Reconstituting a drug just before it is needed ensures maximum potency. When reconstitution is necessary, the drug label lists the following:

- The type of diluent to use
- The amount of diluent to add
- The dosage per volume after reconstitution
- Directions for storing the drug

- **Prefilled Cartridges**

Pharmaceutical companies supply some drugs in a prefilled cartridge (a sealed glass cylinder of parenteral medication).

The cartridge comes with an attached needle. The cylinder is made so that it fits in a specially designed syringe

Combining Medications in One Syringe

Sometimes it is necessary or appropriate to combine more than one drug in a single syringe. Exact amounts must be withdrawn from each drug container because once the drugs are in the barrel of the syringe, there is no way to expel one without expelling some of the other Before mixing any drugs, however, the nurse consults a drug reference or compatibility

chart because some drugs interact chemically when combined.

The chemical reaction often causes formation of a precipitate.

Injection Routes

There are four injection routes for parenteral administration:

- intradermal injections (injections between the layers of the skin).
- subcutaneous injections (injections beneath the skin but above the muscle).
- intramuscular injections (injections in muscle tissue).
- intravenous injections (injections instilled into veins.

Each site requires a slightly different injection technique.

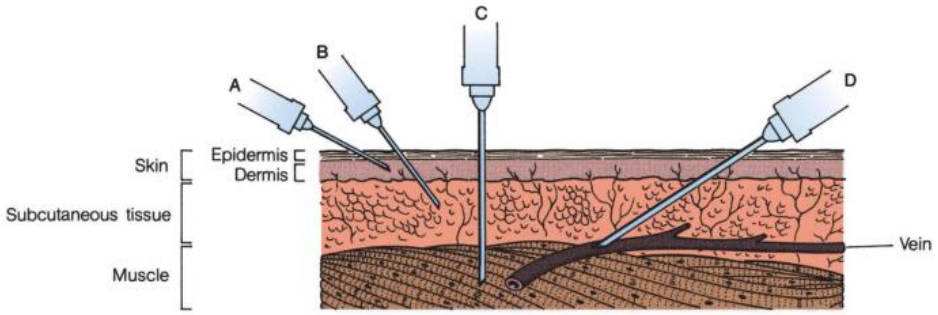


FIGURE 34-10 Injection routes: intradermal (**A**), subcutaneous (**B**), IM and subcutaneous in other than thin persons (**C**), and intravenous (**D**).

1. Intradermal Injections

Intradermal injections are commonly used for diagnostic purposes. Examples include tuberculin tests and allergy testing. Small volumes, usually 0.01 to 0.05 mL, are injected because of the small tissue space.

- **Injection Sites**

A common site for an intradermal injection is the inner aspect of the forearm. Other areas that may be used are the back and upper chest.

- **Injection Equipment**

A tuberculin syringe holds 1 mL of fluid and is calibrated in 0.01-mL increments. It is used

to administer intradermal injections. A 25- to 27-gauge needle measuring, a half-inch in length is commonly used when administering an intradermal injection.

- **Injection Technique**

When giving an intradermal injection, the nurse instills the medication shallowly at a 10- to 15-degree angle of entry.

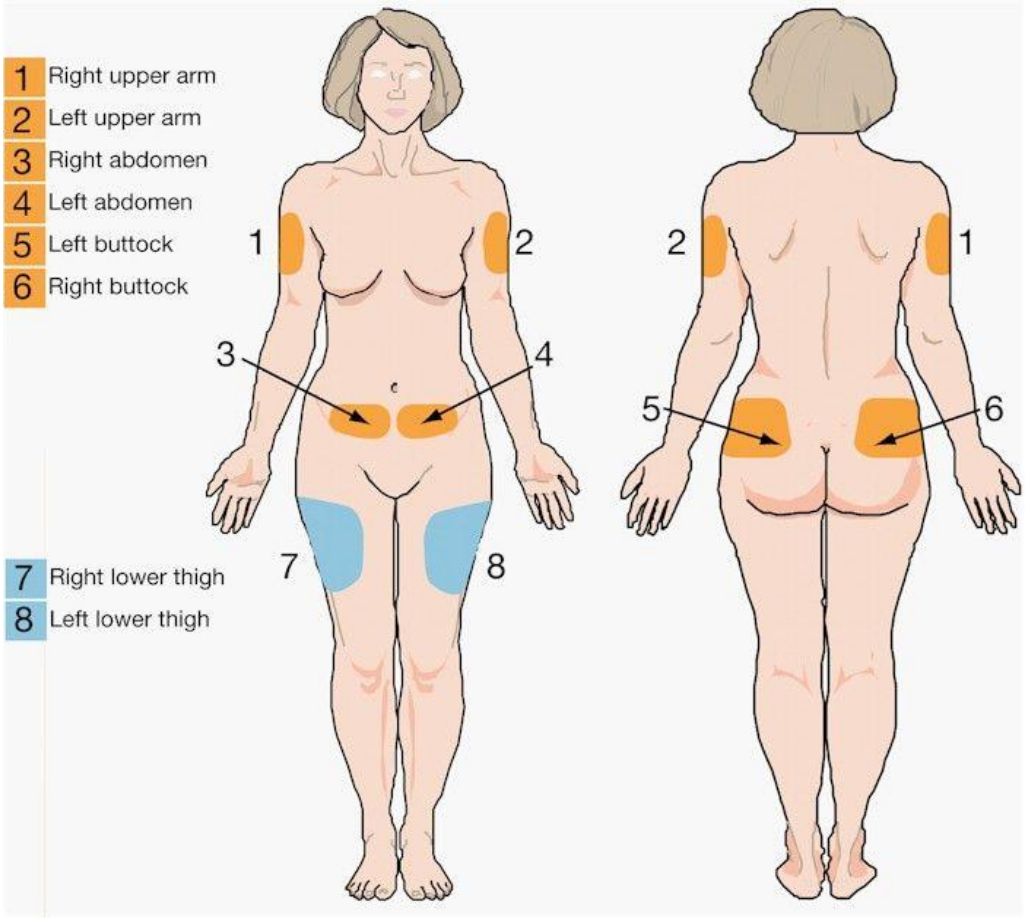
2. Subcutaneous Injections

A subcutaneous injection is administered more deeply than an intradermal injection. Medication is instilled between the skin and muscle and absorbed fairly rapidly:
the medication usually begins acting within 15 to 30 minutes of administration. The volume of a subcutaneous injection is usually up to 1 mL' The subcutaneous route is commonly used to administer insulin and heparin.

- **Injection Sites**

The preferred site for giving a subcutaneous injection of insulin and heparin is **the abdomen.** When using the abdomen, avoid a 2-in. central area around the umbilicus. Additional or alternative injection sites for insulin are the **outer back area of the upper arm**, where it is fleshier, and **the outer areas of the thigh** and **upper buttocks.**
avoid repeatedly injecting into the same area in a short amount of time. Rotating sites avoids tissue injury. The rate of drug absorption at various subcutaneous sites from fastest to slowest is the abdomen, arms, thighs, and upper buttocks.

Subcutaneous injection sites



- **Injection Equipment**

Equipment used for a subcutaneous injection may depend on the type of medication prescribed. Insulin is prepared in an **insulin syringe,** Heparin is prepared in a **tuberculin syringe,** or it may be supplied in a prefilled cartridge. A 25-gauge needle is used most often because medications administered subcutaneously usually are not viscous. Needle lengths may vary from ½ to 5⁄8 in.

- **Injection Technique**

To reach subcutaneous tissue in a normal-sized or obese person who has a 2-in. tissue fold when it is bunched, the nurse inserts the needle at a 90-degree angle. For thin clients who have a 1-in. fold of tissue, the nurse inserts the needle at a 45-degree angle

- **Administering Insulin**

Insulin is a hormone required by some clients with diabetes. The most common route of administration is by subcutaneous or intravenous injection. Injectable insulin is supplied and prescribed in a dosage strength called units (U); a special syringe called an insulin syringe (a syringe calibrated in units) is used. The standard dosage strength of insulin is 100 U/mL. A standard insulin syringe can administer up to 100 U of insulin.

Prefilled pen-like devices that facilitate the repeated administration of insulin through a special pen needle are also available. Depending on the manufacturer, insulin pens can be adjusted to provide insulin in doses from 0.5 to 80 U by dialing the prescribed amount on the pen. The pen generally holds 1 mL (100 U) of insulin. Only the needle is changed with each injection. The insulin in prefilled pens is stable for up to 30 days.

IMPORTANT POINT:

Clients who require insulin receive one or more daily injections. Over time, the injection sites tend to undergo changes that interfere with insulin absorption. To avoid:

- **lipoatrophy** (the breakdown of subcutaneous fat at the site of repeated insulin injections)
- **lipohypertrophy** (the thickening of subcutaneous fat at the site of repeated insulin injections), the sites are rotated each time an injection is administered.

- **Intramuscular Injections**

An intramuscular injection is the administration of up to 3 mL of medication into one muscle or muscle group. Because deep muscles have few nerve endings, irritating medications commonly are given intramuscularly. Except for medications injected directly into the bloodstream, absorption from an intramuscular injection occurs more rapidly than from the other parenteral routes.

Injections should not be administered into limbs that are paralyzed, inactive, or affected by

poor circulation. If an older client has had a mastectomy or has a vascular site for hemodialysis, the arm on the affected side should be avoided, if possible.

- **Injection Sites**

The five common intramuscular injection sites are named for the muscles into which the medications are injected: the dorsogluteal, the ventrogluteal, the vastus lateralis, the rectus femoris, and the deltoid.

1. Dorsogluteal Site

The dorsogluteal site is the upper outer quadrant of the buttocks. The primary muscle in this site is the gluteus maximus, which is large and therefore can hold a fair amount of injected medication with minimal post injection discomfort.

This site is avoided in clients younger than 3 years of age

because this muscle is not yet sufficiently developed.

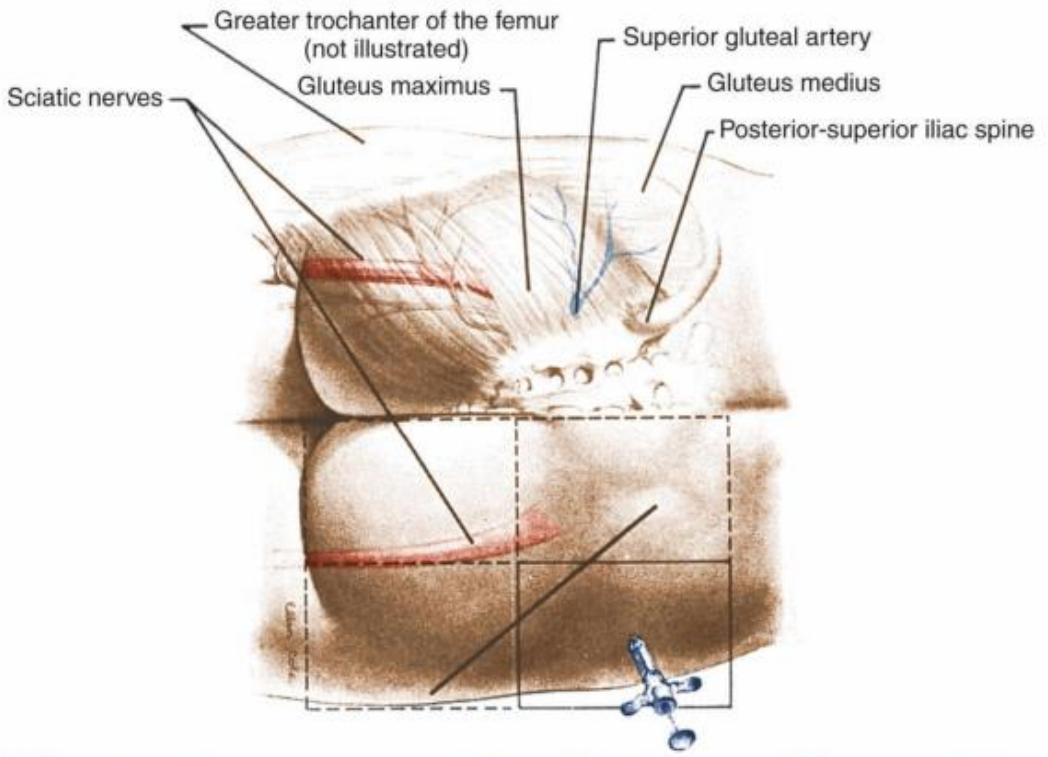


FIGURE 34-21 The dorsogluteal site (Courtesy of Wyeth Laboratories, Philadelphia, PA).

2. Ventrogluteal Site

The ventrogluteal site uses the gluteus medius and gluteus

minimus muscles in the hip for injection. This site has several advantages over the

dorsogluteal site:

- it has no large nerves or blood vessels
- it is usually less fatty
- cleaner because fecal contamination is rare at this site.

This is the favored injection site for adults, but it is also safe for use in children. Its main disadvantage is that there is only a small area for administering the injection (Hunt, 2008).

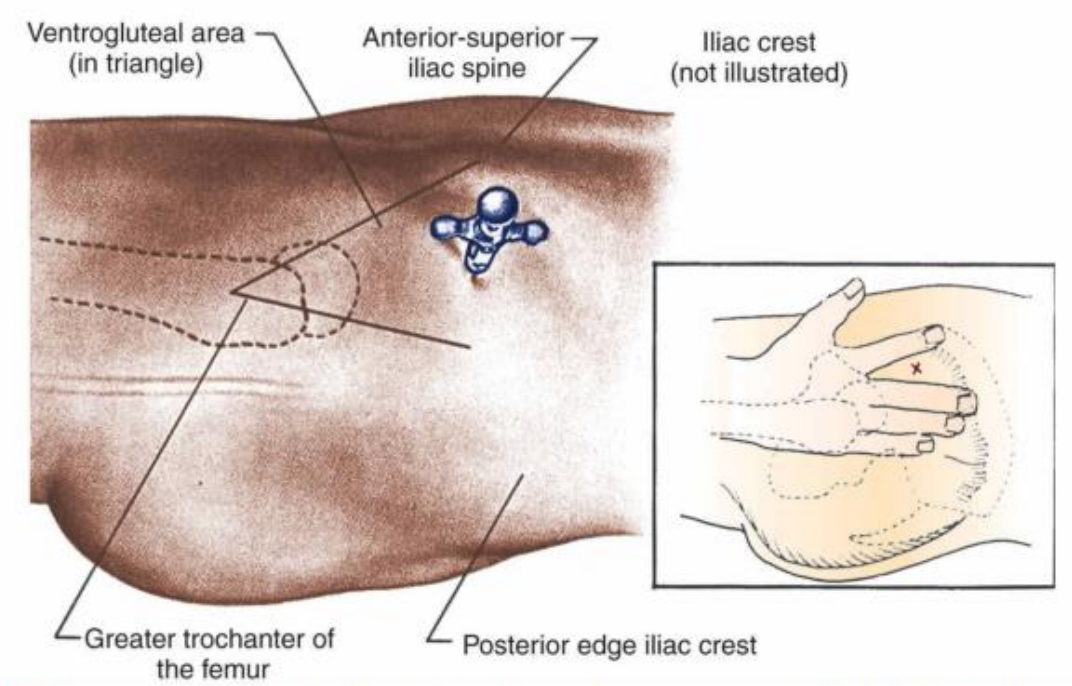


FIGURE 34-17 The ventrogluteal site. (Courtesy of Wyeth Laboratories, Philadelphia, PA.)

To locate the ventrogluteal site:

- Place the palm of the hand on the greater trochanter and the index finger on the anterior-superior iliac spine
- Move the middle finger away from the index finger as far as possible along the iliac crest.
- Inject into the center of the triangle formed by the index finger, the middle finger, and the iliac crest.

3. Vastus Lateralis Site

The vastus lateralis site uses the vastus lateralis muscle { one of the muscles in the quadriceps group of the outer thigh.}

Large nerves and blood vessels usually are absent in this area, which makes it safer. It is a particularly desirable site for administering injections to infants and small children and clients who are thin or debilitated with poorly developed gluteal muscles.

The nurse locates the vastus lateralis site by placing one hand above the knee and one hand just below the greater trochanter at the top of the thigh. He or she then inserts the needle into the lateral area of the thigh.

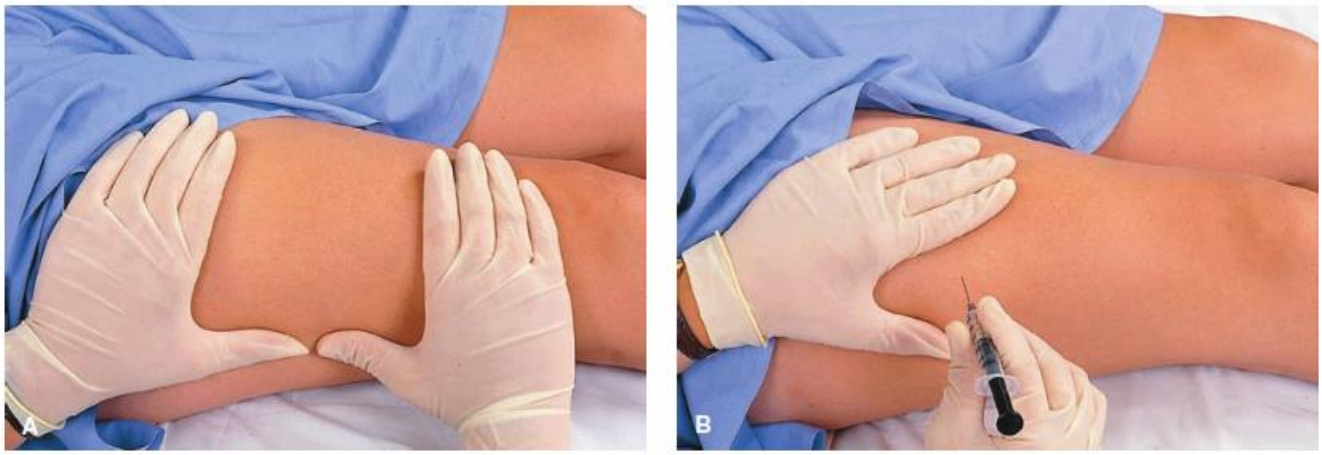


FIGURE 34-16 **A.** Locating the vastus lateralis muscle. **B.** Spreading the skin at the vastus lateralis site and darting the tissue. (Photo by B. Proud.)

4. Rectus Femoris Site

The rectus femoris site is in the anterior aspect of the thigh. This site may be used for infants. The nurse places an injection in this site in the middle third of the thigh, with the client sitting or supine

FIGURE 34-17 The location of the rectus femoris injection site. (Craven, R.F., & Hirnle, C.J. [2009]. *Fundamentals of nursing* [6th ed., p 530]. Philadelphia: Lippincott Williams & Wilkins.)

5. Deltoid Site

The deltoid site, in the lateral aspect of the upper arm is the least used intramuscular injection site because it is a smaller muscle than the others. It is used only for adults because the muscle is not sufficiently developed in infants and children. Because of its small capacity, intramuscular injections into this site are limited to 1 mL of solution.

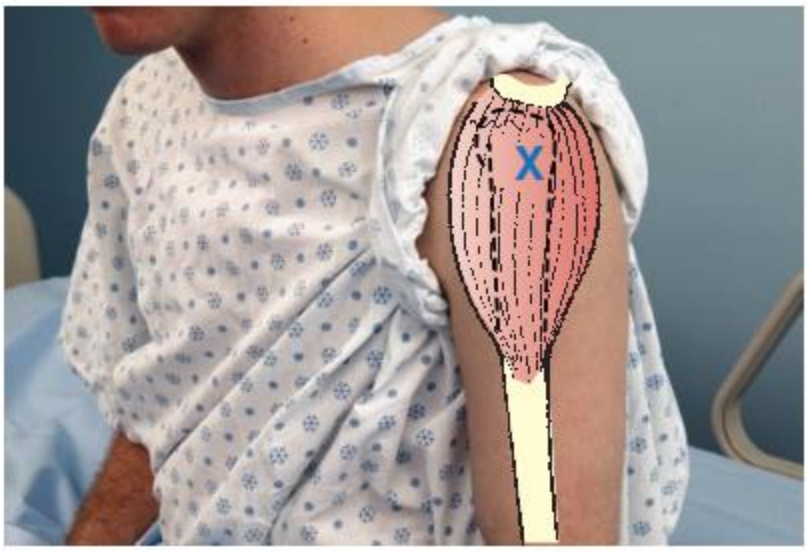


FIGURE 34-18 The deltoid site.

Z-track Technique

- **Injection Technique**

Nurses may administer drugs that may be irritating to the upper levels of tissue by the **Z-track technique**

(a technique for manipulating the tissue to seal a medication, especially an irritant, in the muscle). Sometimes called the zigzag technique, the maneuver resembles the letter Z

Nurses can give any intramuscular injection by the Z-track technique. Clients report slightly less pain during and the next day after a Z-track injection compared with the usual intramuscular injection technique.

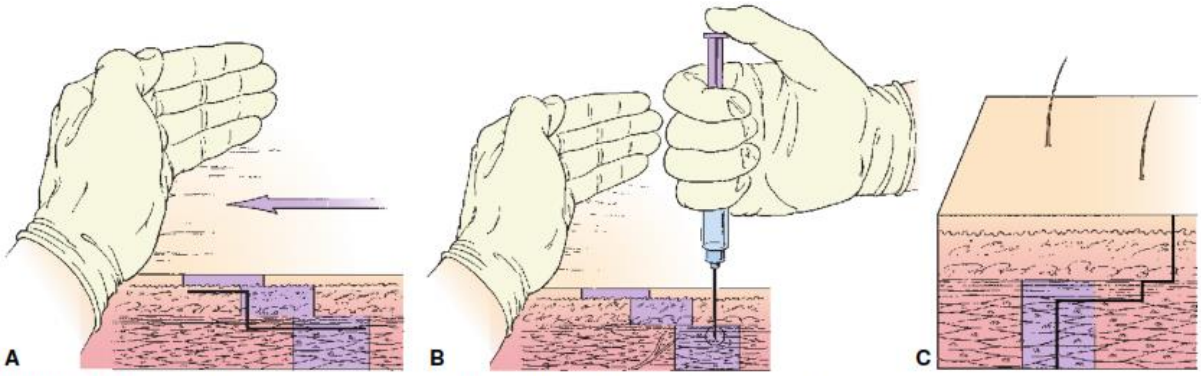


FIGURE 34-19 **A.** Stretching the tissue laterally. **B.** Manipulating the plunger. **C.** An interrupted pathway to the sealed medication.

- **Injection Equipment**

Generally, 3- to 5-mL syringes are used to administer medications by the intramuscular route. A 22-gauge needle that is 1½ to 2 in. long is usually adequate for depositing medication in most sites.

Reducing Injection Discomfort

All injections cause discomfort, and some cause more than others. The nurse can use the following alternative techniques

to reduce discomfort associated with injections:

- Use the smallest gauge needle that is appropriate.
- Change the needle before administering a drug that is irritating to tissue.
- Select a site that is free of irritation.
- Rotate injection sites.

Reducing Injection Discomfort cont.

- Numb the skin with an ice pack before the injection.
- Insert and withdraw the needle without hesitation.
- Instill the medication slowly and steadily.
- Use the Z-track technique for intramuscular injections.
- Apply pressure to the site during needle withdrawal.
- Massage the site afterward, if appropriate.

The client also can assist in minimizing the pain associated with injections. Instructions commonly focus on positioning and relaxation techniques

Nursing Implications

Nurses who administer parenteral medications may identify nursing diagnoses as follows:

- Acute Pain
- Anxiety
- Fear

- Risk for Trauma
- Deficient Knowledge
- Risk for Ineffective Self-Health Management

Chapter 12

Intravenous Medications

Learning Objectives

On completion of this chapter, the students should be able to:

1. Name two types of veins into which intravenous medications are administered.
2. Describe at least three appropriate situations for administering intravenous medications.
3. Name two ways by which intravenous medications are administered.
4. Describe one method for giving bolus administrations of intravenous medications.
5. Describe two methods for administering medicated solutions intermittently.
6. Explain the technique for administering a secondary piggyback infusion.
7. Discuss two purposes for using a volume-control set.
8. Describe a central venous catheter.
9. Name three types of central venous catheters.
10. Discuss two techniques for protecting oneself when administering antineoplastic drugs.

Intravenous Medications

Intravenous Route

The intravenous route (a drug administration through peripheral and central veins) provides an immediate effect. Consequently, this route of drug administration is the most dangerous. Drugs given in this manner cannot be retrieved once they have been delivered. Hence, only specially qualified nurses are permitted to administer IV medications.

Those responsible for IV medication administration must use extreme caution in preparation and instillation.

Intravenous Medication Administration

Despite its risks, IV administration given either continuously or intermittently is the route chosen when:

- A quick response is needed during an emergency.
- Clients have disorders that affect the absorption or metabolism of drugs. (e.g., serious burns)
- Blood levels of drugs need to be maintained at a consistent therapeutic level such as when treating infections
- It is in the client's interest to avoid the discomfort of repeated intramuscular injections.
- A mechanism is needed to administer drug therapy over a prolonged period, as with cancer.

- **Continuous Administration**

A continuous infusion **(an instillation of a parenteral drug over several hours)**, also called a continuous drip, involves adding medication to a large volume (500 to 1,000 mL)

of IV solution.

Drugs may be added to a new container of IV solution or to an existing infusion if there is a sufficient volume to dilute the drug. After the medication is added, the solution is administered by gravity infusion or, more commonly, with an electronic infusion device such as a controller or pump

- **Intermittent Administration**

Intermittent infusion is a short-term (from minutes up to 1 hour), parenteral administration of medication. Intermittent infusions are administered in three ways:

- bolus administrations.
- Secondary administrations.
- volume-control set.

1. Bolus Administration

The term bolus refers to a substance given all at one time. **A bolus administration** (an undiluted or a diluted medication given into a vein in 1 or more minutes) sometimes is described as an **IV push**. Although the term **"push"** is used, the medication is administered at the rate specified in a drug reference or at a rate of 1 mL per minute if no information is available.

Bolus administrations are given in one of two ways: through: **a port** in an existing IV line or through:

a medication lock.

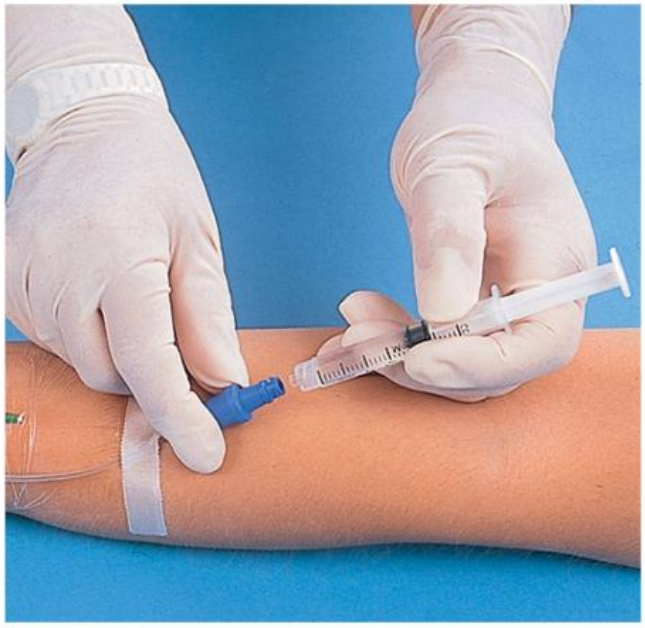


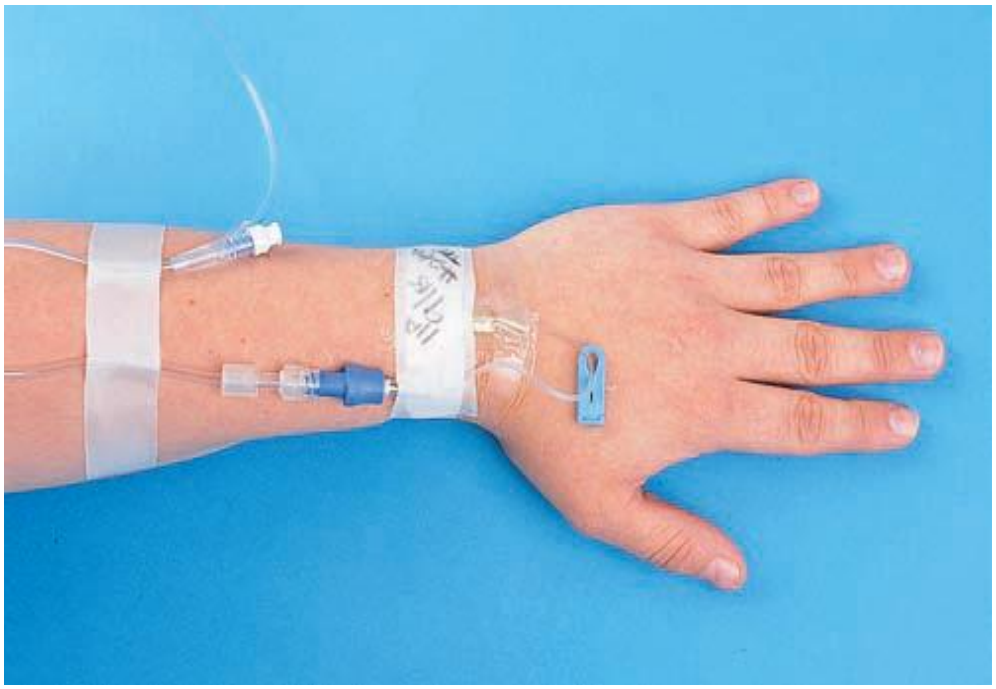
FIGURE 35-2 Accessing a medication lock. (From Craven, R. F., Hirnle, C. J., & Jensen, S. (2012). *Fundamentals of nursing* [7th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins.)

- **Using an IV Port**

A port (a sealed opening) extends from the IV tubing. The seal is made of latex or another substance that can be pierced with a needle or needleless adapter

Because the entire dose is administered quickly, a bolus administration has the greatest potential for causing life threatening changes should a drug reaction occur.

If the client's condition changes for any reason, the administration is ceased immediately, and emergency measures are taken to protect the client's safety.



Administering Medications Through an Intravenous Port

- Prepare the medication in a syringe.
- Check the client's identity using at least two methods; for example, checking the wristband and asking the client's name.
- Locate the port nearest the IV insertion site.
- Swab the port with an alcohol sponge
- Pierce the port with the needle or a needleless adapter
- Pinch the tubing above the access port
- Pull back on the plunger of the syringe.
- Observe for blood in the tubing near the IV catheter or insertion device.
- Gently instill a few tenths of a milliliter of medication.
- Release the tubing.
- Continue the pattern of pinching the tubing, instilling a small amount of drug, and releasing the tubing until the medication has been administered over the specified period.

B) Using a Medication Lock

A medication lock is also called a saline or heparin lock or an intermittent infusion device. Briefly, a medication lock is a plug that, when inserted into the end of a IV catheter, allows for instant access to the venous system. One of its best features is that it eliminates the need for a continuous, and sometimes unnecessary, administration of IV fluid. Instilling IV medication through a lock is similar to the routine for keeping it patent. The technique varies depending on whether the agency's policy

Nurses use the mnemonic **SAS** or **SASH** as a guide to the steps involved in administering IV medication into a lock.

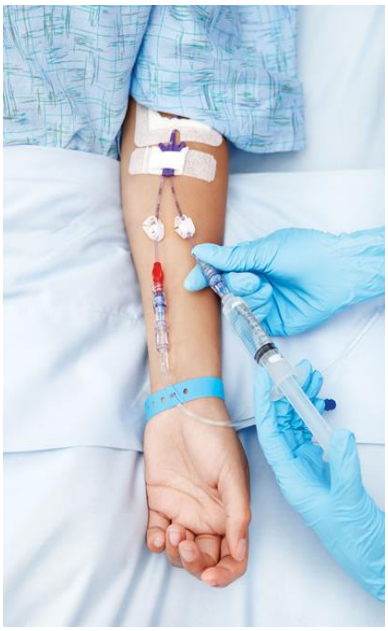
SAS stands for flush with saline, administer the drug, flush again with saline;

SASH refers to flush with saline, administer the drug, flush again with saline, instill heparin.

To maintain patency, nurses usually flush medication locks after each use with saline or heparin or every 8 to 12 hours

Nurses change medication locks when changing the IV site or at least every 72 hours.

If the nurse cannot verify patency by obtaining a blood return, and if there is resistance or leaking when administering the flush solution, she or he removes the IV catheter, changes the site, and replaces the lock.



Administering Medications Through a Lock

- Prepare three syringes, two with at least 1 mL of sterile normal saline and one with the prescribed medication.
- Prepare a fourth syringe with heparin (10 U/mL), if it is the agency's policy to use it.
- Label all the syringes in some way such as attaching pieces of tape with the letters "S" and "H."
- Check the client's identity using at least two methods; for example, checking the wristband and asking the client's name.
- Wipe the medication port with an alcohol swab.
- Wipe the medication port with an alcohol swab.
- Insert the needle or needleless device from the syringe containing saline through the "bull's eye" of the rubber seal on the medication lock
- Hold the lock and pull back on the plunger of the syringe.
- Observe for blood in the tubing where the tubing connects to the venous catheter or in the barrel of the syringe.
- Instill the saline (the first "S" in the mnemonic).

- Gently and gradually administer the medication over the specified time period (the letter “A” in the mnemonic).
- Remove the syringe when it is empty, wipe the lock again, insert the second syringe with saline, and instill the fluid (the second “S” in the mnemonic).
- Begin to withdraw the syringe while instilling the last of the fluid in the syringe.
- Wipe, insert, and instill the heparin (the “H” in the mnemonic), if that is agency policy, using the same technique for withdrawal as with the final flush with saline.
- Deposit all uncapped syringes in the nearest puncture-resistant biohazard container.

2. Secondary Infusions

A secondary infusion is the administration of a parenteral drug that has been diluted in a small volume of IV solution, usually 50 to 100 mL, over 30 to 60 minutes. It also is called a piggyback infusion

3. Volume-Control Set

A volume-control set is a chamber in IV tubing that holds a portion of the solution from a larger container. It is known by various commercial names such as Volutrol, Soluset, and **Burette**. A volume-control set is used to administer IV medication in a small volume of solution at intermittent intervals and to avoid accidentally overloading the circulatory system.

Central Venous Catheters

A central venous catheter (a venous access device that extends to the superior vena cava) provides a means of administering parenteral medication in a large volume of blood. A CVC is used when:

- Clients require long-term IV fluid or medication administration.
- IV medications are irritating to peripheral veins.
- It is difficult to insert a peripherally venous catheter.

CVCs have single or multiple lumens. With multiple lumens, incompatible substances or more than one

There are three types of CVCs: Nontunneled Percutaneous, Tunneled, and Implanted.

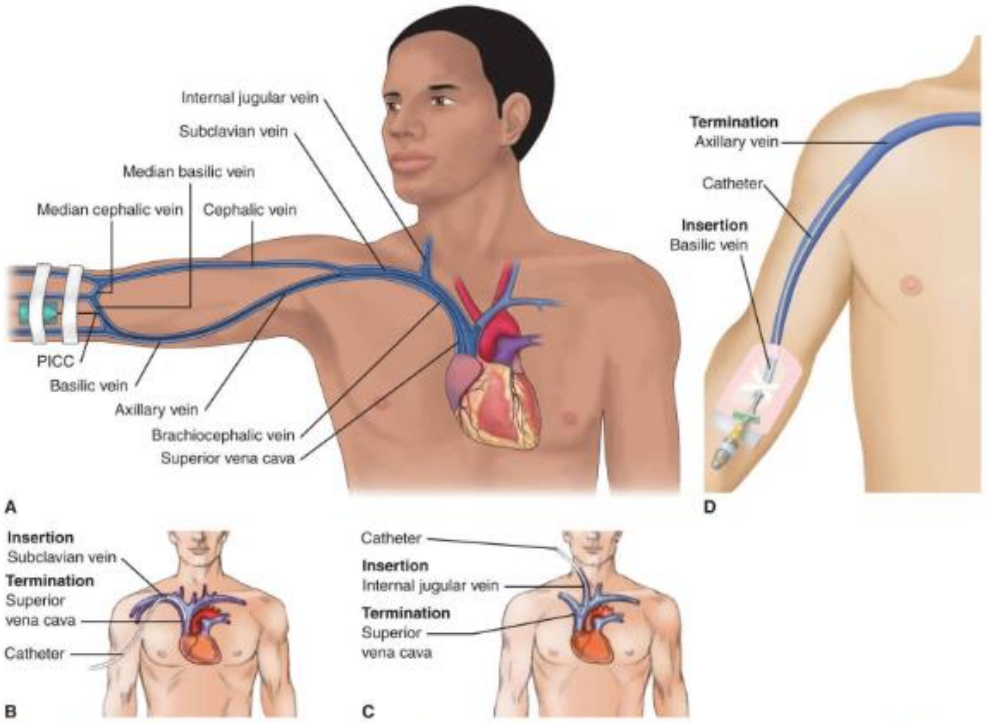


FIGURE 35-6 **(A)** The location of a peripherally inserted central catheter (PICC). **(B)** The location of a percutaneous catheter inserted in the subclavian vein. **(C)** The location of a percutaneous catheter inserted in the jugular vein. **(D)** The location of a midline catheter in the basilic vein. (D, from Timby, B. K., & Smith, N. E. [2010]. *Introductory medical-surgical nursing* [10th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins [PE].)

- **Nontunneled Percutaneous Catheters**

A nontunneled percutaneous catheter is inserted through the skin in a peripheral vein (e.g., the basilic, cephalic, jugular, or subclavian vein) with the distal end terminating in the superior vena cava.

Nontunneled percutaneous catheters are used when clients require short-term fluid therapy, parenteral nutrition, or medication therapy lasting a few days or weeks.

2. Tunneled Catheters

Tunneled catheters are inserted into a central vein with part of the catheter secured in the subcutaneous tissue. The end of the catheter exits from the skin lateral to the xiphoid process

Tunneled catheters are used when the client requires extended therapy.

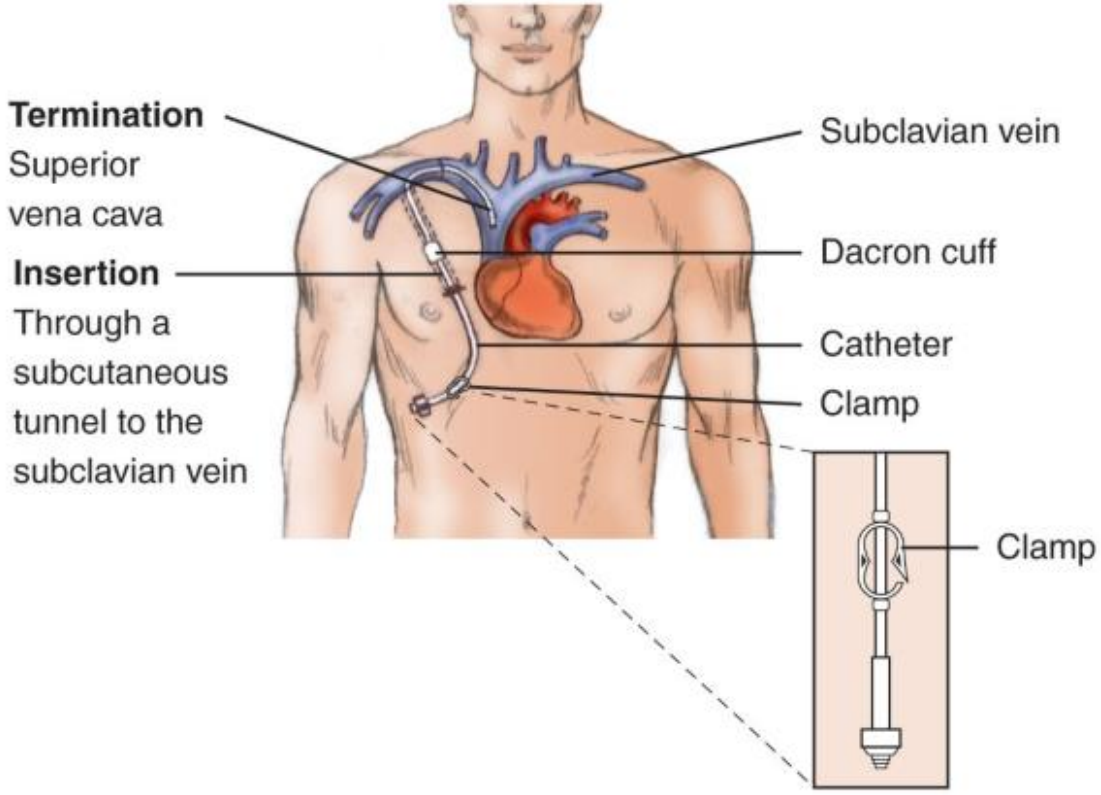


FIGURE 35-7 A tunneled catheter.

3. Implanted Catheters

An implanted catheter (e.g., the Porta-Cath) is sealed beneath the skin and provides the greatest protection against infection because it is totally confined internally without any exposed external portion. Implanted catheters have a self-sealing port pierced through the skin with a special needle when administering IV medications or solutions. To reduce skin discomfort, a local anesthetic is first applied topically. Implanted ports can sustain approximately 2,000 punctures; thus, the catheter can remain in place for several years, barring complications. A dressing is applied only when the port is pierced and the catheter is being used. Implanted catheters remain patent with a periodic flushing with heparin.

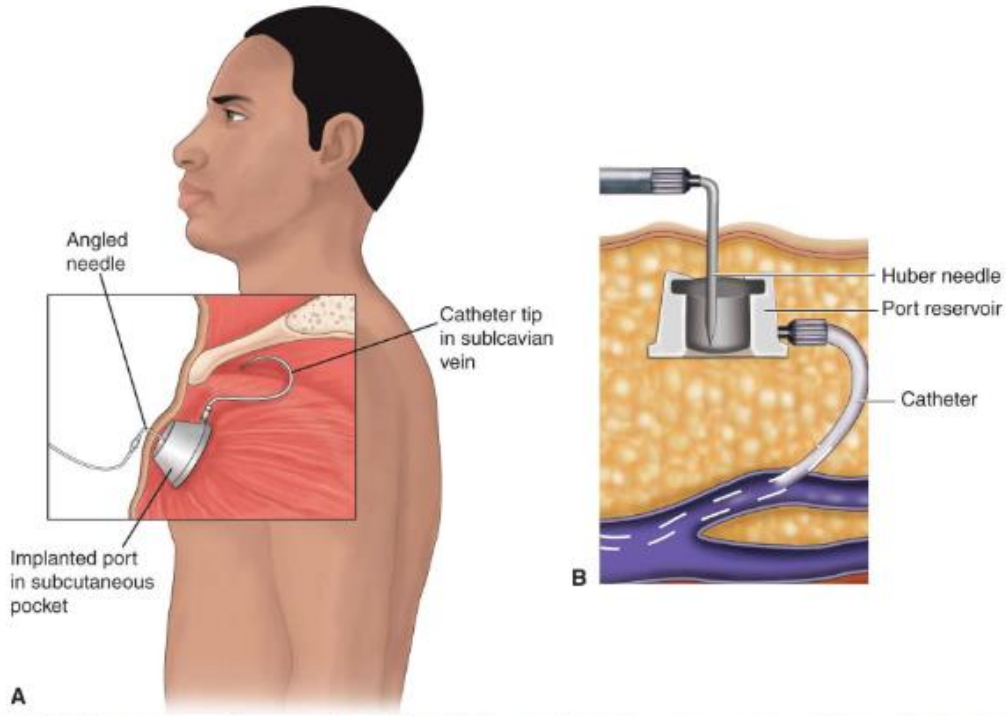


FIGURE 35-8 The placement of an implanted catheter with access via a port. **(B)** Noncoring (Huber)

Medication Administration Using a Central Venous Catheter

IV medications may be instilled through any type of CVC. Continuous or intermittent infusions may be used

Antineoplastic drugs (medications used to destroy or slow the growth of malignant cells) also are commonly referred to as chemotherapy or just chemo. CVCs often are used to administer antineoplastic drugs to clients with cancer.

Antineoplastic agents are toxic to both normal and abnormal cells. These drugs can even cause adverse effects in the pharmacists who mix them and in the nurses who administer them.

Caregivers can absorb antineoplastic drugs through skin contact, inhalation of tiny fluid droplets or dust particles on which the droplets fall, or oral absorption of drug residue during hand-to-mouth contact. When transferred to the caregiver, these drugs can cause

headaches, nausea, dizziness, and burning or itching of the skin. Long-term exposure can lead to changes in fast-growing body cells, including sperm, ova, or fetal tissue.

It is important, therefore, that nurses use safety measures when administering these drugs and avoid exposure and contact with hazardous materials. The pharmacist wears protective clothing when preparing the drugs The pharmacist usually attaches a special label to warn nurses to take special precautions during drug administration.

FIGURE 35-11 Example of a chemotherapy warning label that is attached to IV solutions containing an antineoplastic drug. (Photo by Ken Timby)

Common recommendations for avoiding self-contamination with antineoplastic drugs include the following:

1. Cover the drug preparation area with a disposable paper pad, which will absorb small drug spills.
2. Wear a long-sleeved, cuffed, low-permeability gown with a closed front.
3. Wear one or two pairs of surgical latex, nonpowdered gloves to reduce the potential for skin contact and inhalation of drug powder.
4. Cover the cuffs of the gown with the cuffs of the gloves.
5. Wear a mask or respirator and goggles if there is a potential for aerosolization or drug splash.

6. Pour 70% alcohol over any drug spill to inactivate the drug.
7. Clean the spill area with detergent and water at least three times, and then rinse with clean water.
8. Dispose of all substances that contain drug material in a biohazard container.
9. Perform scrupulous hand washing after removing gloves.

Using a Central Venous Catheter

1. Prepare the IV solution, tubing, and drug using the steps for administering a continuous or secondary infusion.
2. Prepare a syringe with 3–5 mL of sterile normal saline solution.
3. Release the clamp, if there is one, on the exposed section of the catheter.
4. Swab the sealed port at the end of the catheter with alcohol.
5. Insert the syringe containing the saline into the port and instill the flush solution
6. Swab again and insert the needle, the recessed needle, or the needleless adapter that connects to the prepared IV medication through the port.
7. Tape the connection.
8. Release the clamp on the tubing and regulate the rate of infusion.
9. Remove the needle or adapter from the port when the medicated
10. solution has instilled.
11. Flush the catheter with saline or heparin or both according to agency protocol.
12. Reclamp the catheter.

Nursing Implications

Although the administration of all parenteral drugs involves specialized skills, the administration of IV medications in general and antineoplastic drugs in particular requires extreme caution. Nurses may identify the following nursing diagnoses:

- Anxiety

- Risk for Infection
- Fear
- Excess Fluid Volume
- Risk for Injury
- Ineffective Protection

Chapter 13

Airway Management

Learning Objectives

On completion of this chapter, the students should be able to:

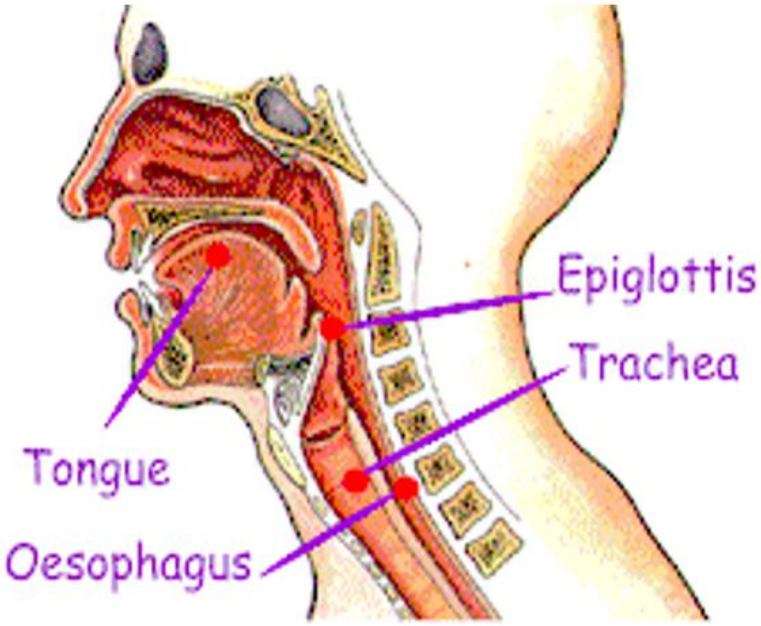
1. Define airway management.
2. Identify the structural components of the airway.
3. Discuss four natural mechanisms that protect the airway
4. Explain the methods used by nurses to help maintain the natural airway.
5. Name two techniques for liquefying respiratory secretions.
6. Explain the three techniques of chest physiotherapy.
7. Describe at least three suctioning techniques used to clear the airway.
8. Name two examples of artificial airways.
9. Discuss two indications for inserting an artificial airway.
10. Identify three components of tracheostomy care.

The Airway

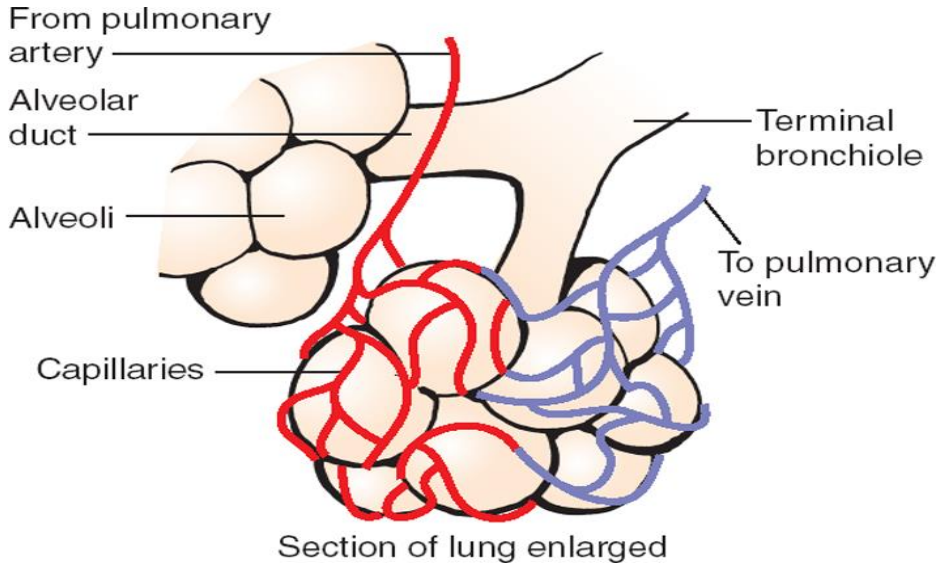
The respiratory system

Primary function is to permit ventilation by clearance the airway from mucus (mixture of water, mucin, white blood cells, electrolyte and cell have been shed naturally).

- The importance of a clear airway to permit good ventilation



The Airway and Related Structures



Section of lung enlarged

Structures that protect the airway from inhaled substances

- Epiglottis – acts as a "lid"that closes during swallowing directs fluid and food towards esophagus rather than respiratory tract
- Tracheal cartilage to keeps airway open
- Mucous membrane lines respiratory passages and traps particulate matter
- Cilia collects debris that collects in the lower airway upwards

Gerontologic Considerations

Respiratory cilia become less efficient with age, pre-disposing older adults to a high incidence of pneumonia

Definition of sputum:

Mucus (mixture of water, mucin, white blood cells, electrolyte and cell have been shed naturally) raised to the level of the upper airways

Natural Airway Management

- **Liquefying secretions**
  - Encouraging adequate hydration: fluid intake, tends to keep mucous

membranes moist and mucus thin.

- Inhalation therapy: Respiratory treatments that provide a mixture of oxygen, humidification, and aerosolized medications directly to the lungs

- **Mobilizing secretions**

Chest physiotherapy

- Postural drainage with Percussion and Vibration: Postural drainage is a positioning technique that promotes the drainage of secretions from various lobes or segments of the lungs with the use of gravity .

Aerosol Therapy

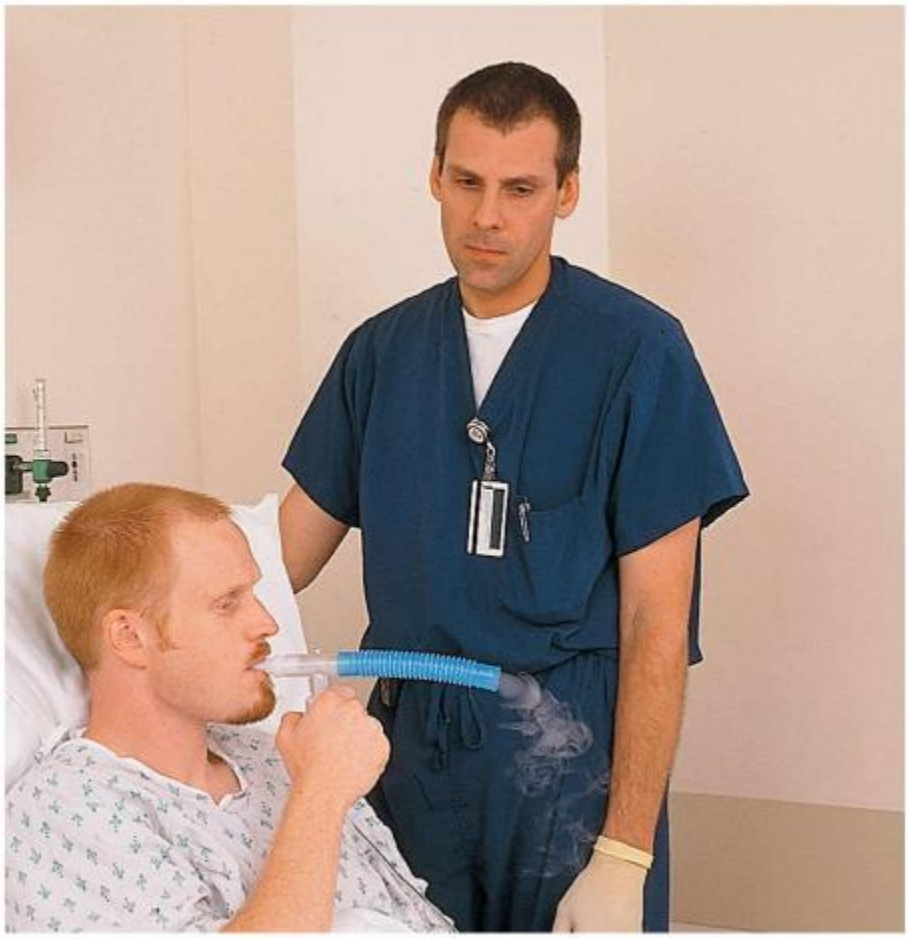


FIGURE 36-3 Aerosol therapy. (Photo by B. Proud.)

Lung Segments and Corresponding Postural Drainage Positions

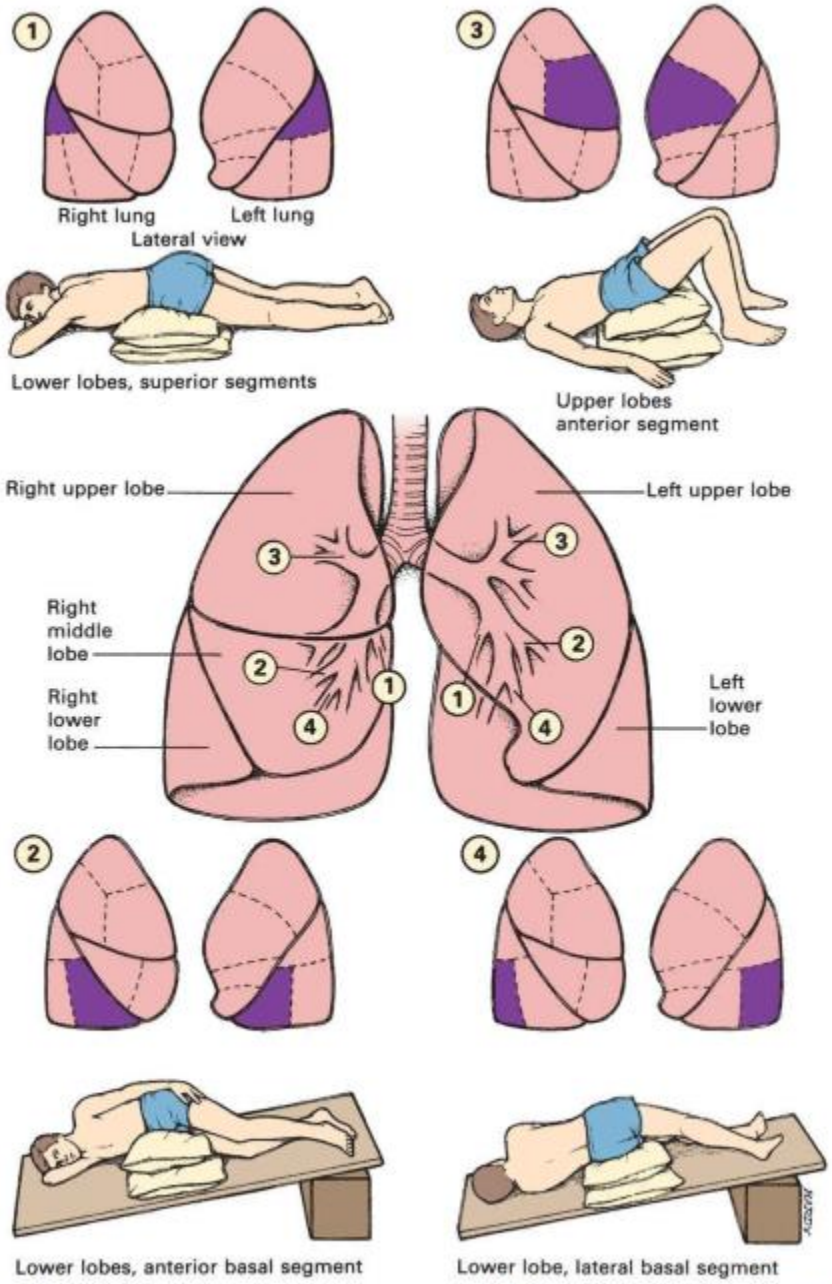


FIGURE 36-4 The lung segments and corresponding postural drainage positions. (Rosdahl, C. [2007]. *Textbook of basic nursing* [9th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins.)

Performing Postural Drainage

Client and Family Teaching 36-1 Considerations Performing Postural Drainage

The nurse teaches the client and family as follows:

- Plan to perform postural drainage two to four times daily (eg, before meals and at bedtime).
- Administer the prescribed inhalant medications (see Chap. 33) before performing postural drainage.
- Have paper tissues and waterproof container nearby for collecting expectorated sputum.
- Position yourself to drain the appropriate lung areas.
- Cough and expectorate secretions that drain into the upper airway.
- Remain in each prescribed position for 15 to 30 minutes (no longer than 45 minutes).
- Resume a comfortable position after expectorating the usual volume of sputum or if you become tired, feel lightheaded, or have a rapid pulse rate, difficulty breathing, or chest pain.

Percussion (the rhythmic striking of the chest wall) helps to dislodge respiratory secretions that adhere to the bronchial walls.

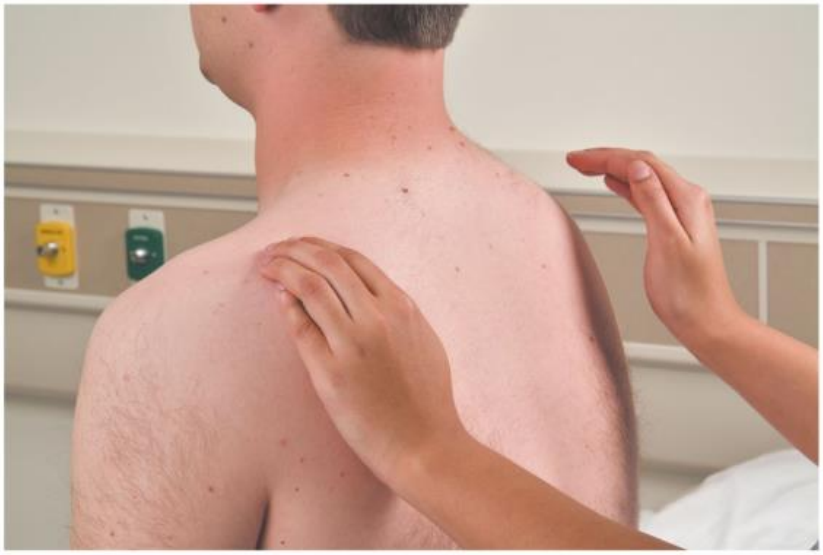


FIGURE 36-5 Performing percussion.

Vibration uses the palms of the hands to shake underlying tissue and loosen retained secretions.

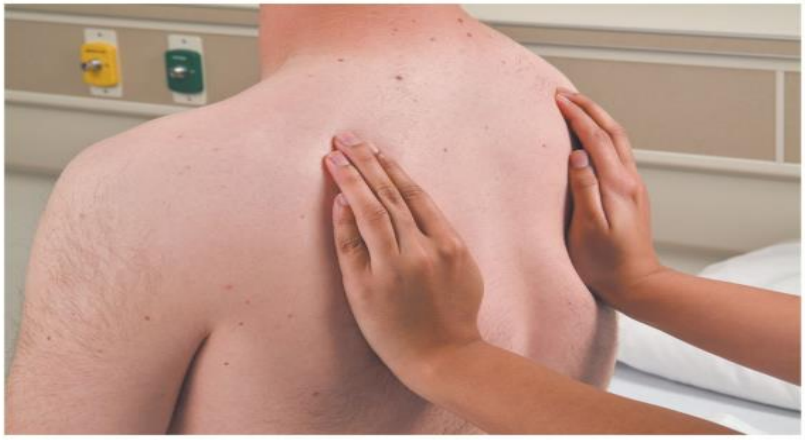


FIGURE 36-6 Performing vibration.

Collecting a Sputum Specimen

- Plan to collect a sputum specimen just after the client awakens or after an aerosol treatment, This timing allows for a collection when more mucus is available or is in a thinner state.
- Obtain a sterile sputum specimen cup. Sterility prevents contamination of the specimen.
- Help the client to a sitting position. Sitting provides for an increased volume of inspired air and more forceful coughing to expel mucus
- Encourage the client to rinse the mouth with tap water. Tap water removes some microorganisms and food residue.
- Explain that the desired specimen should lie from deep within the respiratory passages, not saliva from within the mouth. The correct instruction helps to prevent inconclusive or invalid test results.
- Instruct the client to take several deep breaths, attempt a forceful cough, and expectorate 1- 3ml into the specimen container. These measures help to mobilize secretions from the lower airway.

- **Suctioning secretions**
  - **Nasopharyngeal suctioning**: Removing secretions from the throat through a nasally inserted catheter.
  - **Nasotracheal suctioning:** Removing secretions from the upper portion of the lower airway through a nasally inserted catheter.
  - **Oropharyngeal suctioning:** Removing secretions from the throat through an orally inserted catheter.
  - **Oral suctioning:** Removing secretions from the mouth) with a suctioning device called a Yankauer-tip or tonsil-tip catheter.

Yankauer -Tip Suction Device for Oral Suctioning

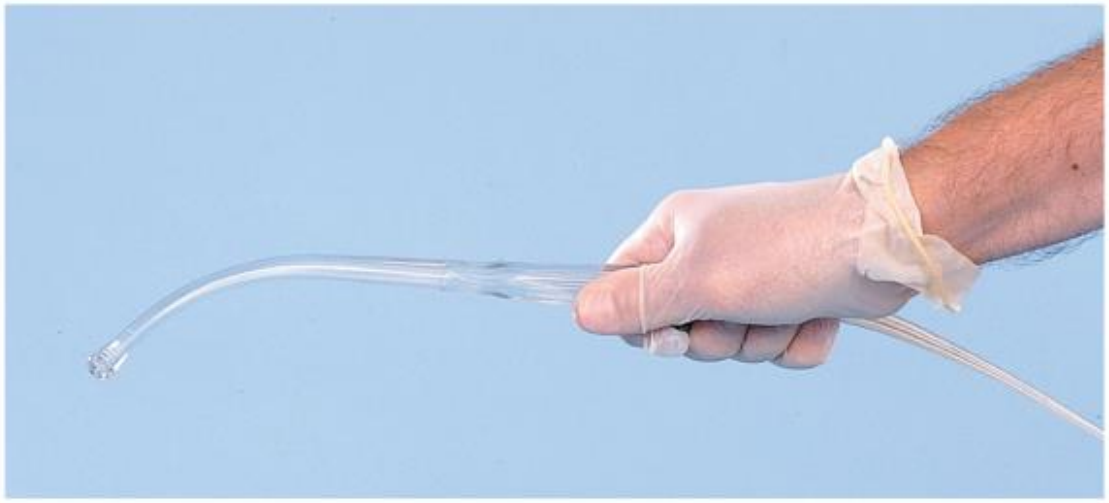


FIGURE 36-8 A Yankauer-tip suction device for oral suctioning. (Photo by B. Proud.)

Variations in Suction Pressure

TABLE 36-1 Variations in Suction Pressure

AGE	WALL SUCTION	PORTABLE SUCTION MACHINE
Adults	100–140 mm Hg	10–15 mm Hg
Children	95–100 mm Hg	5–10 mm Hg
Infants	50–95 mm Hg	2–5 mm Hg

Artificial Airway Management

- **Oral airway:** An oral airway is a curved device that keeps a relaxed tongue positioned forward within the mouth, preventing the tongue from obstructing the upper airway

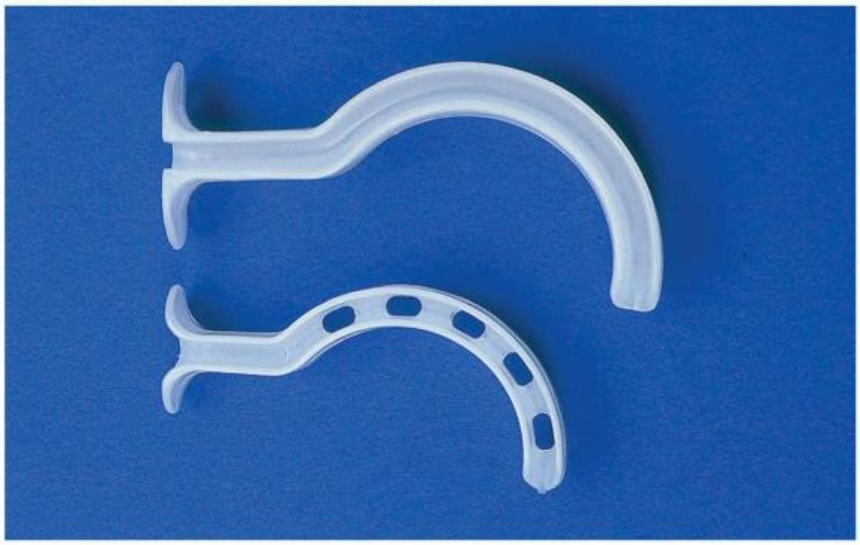


FIGURE 36-9 Examples of oral airways.

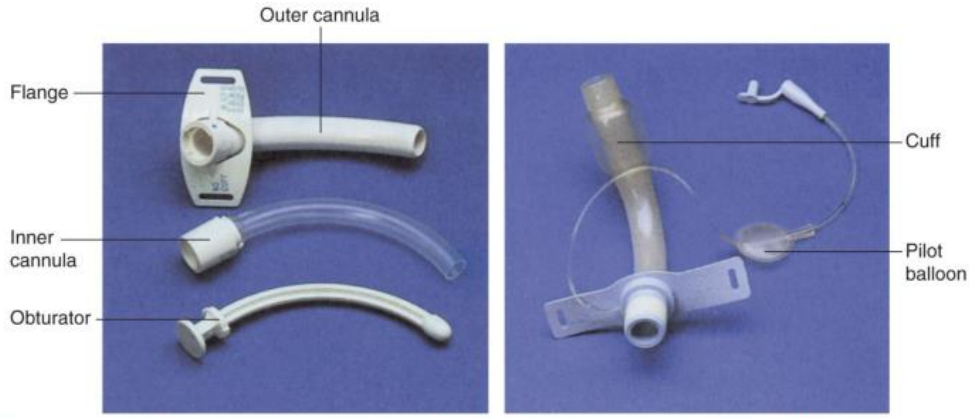


FIGURE 36-10 Examples of uncuffed and cuffed tracheostomy tubes. (From Pilliteri, A. [2014]. *Maternal and child health nursing* [7th ed.]. Philadelphia, PA: Lippincott Williams & Wilkins [PE].)

Tracheostomy: A surgically created opening into the trachea.

Tracheostomy tube: A tube is inserted through the opening to maintain the airway and provide a new route for ventilation.

Tracheostomy suctioning: When suctioning a tracheostomy, the nurse inserts the catheter a shorter distance approximately 10 to 12.5 cm or until resistance is felt

Tracheostomy Care

Tracheostomy care means cleaning the skin around the stoma, changing the dressing, and cleaning the inner cannula.

Nurses perform tracheostomy care at least every 8 hours or as often as clients need to keep the secretions from becoming dried, then narrowing or occluding the airway. They may do tracheal suctioning separately from or at the same time as tracheostomy care.

General Gerontology Considerations

- The muscular structures of the larynx tend to atrophy with age, which can affect the ability to clear the airway.
- Usually, the bases of the older adult's lungs receive less ventilation, contributing to the retention of secretions, decreased air exchange, and compromised ventilation. Respiratory cilia become less efficient with age, predisposing older adults to a high incidence of pneumonia. w. Diminished strength of accessory muscles for respiration, an increased rigidity of the chest wall, and a diminished cough reflex make it difficult for older adults to cough productively and effectively.

- An Older adults with difficulty swallowing (dysphagia), often associated with strokes or middle and late stages of dementia, are more vulnerable to aspiration pneumonia. An evaluation of the dysphagia is important for implementing appropriate interventions to prevent aspiration.

NURSING IMPLICATIONS

Maintaining an open and patent airway is a priority for nursing care. Lack of oxygen for more than 4 to 6 minutes can result in death or permanent brain damage. Therefore, it is essential to identify nursing diagnoses that apply to respiratory problems and to plan care accordingly for clients at risk. Some possible nursing diagnoses include the following:

- Ineffective Airway Clearance
- Impaired Gas Exchange
- Risk for Infection
- Impaired Spontaneous Ventilation
- Anxiety
- Deficient Knowledge.

Chapter 13

End-of-Life Care

Learning Objectives

On completion of this chapter, the Students should be able to:

1. Define terminal illness.
2. Name the five stages of dying.
3. Describe two methods by which nurses can promote the acceptance of death in dying clients.
4. Define respite care.
5. Discuss the philosophy of hospice care.
6. List at least five aspects of terminal care.
7. Name at least five signs of multiple organ failure.
8. Explain why a discussion of organ donation must take place as expeditiously as possible following a client's death.
9. Name three components of postmortem care.
10. Explain the difference between a clinical autopsy and a forensic autopsy and the manner in which postmortem care is implemented.
11. Discuss the benefit of grieving and one sign that grief is being resolved.

Terminal Illness and Care

- Terminal illness: recovery from the condition is beyond reasonable expectations, a progressive disease where death as a consequence of that disease can reasonably be expected within 6 months.

Stages through which terminally ill clients progress

- Denial: psychological defense mechanism; refusal to believe certain information; helps to cope with reality of death
- Anger: emotional response to feeling victimized; occurs because there is no way to retaliate(الانتقام) against fate. Clients often displace their anger onto nurses, physicians, family members, even God.
- Bargaining: psychological mechanism to delay the inevitable until some significant event takes place.
- Depression: sad mood; realization that death will come sooner rather than later
- Acceptance: attitude of complacency that occurs after clients have dealt with their losses and completed unfinished business.

Stages of Dying

TABLE 38-1 Stages of Dying

STAGE	TYPICAL EMOTIONAL RESPONSE	TYPICAL COMMENT
First stage	Denial	"No, not me"
Second stage	Anger	"Why me?"
Third stage	Bargaining	"Yes, me, but if only…"
Fourth stage	Depression	"Yes, me."
Fifth stage	Acceptance	"I am ready."

- Nurses can help clients to pass from one stage to another by providing emotional support and by supporting the client's choices concerning terminal care. Facilitating the client's directives helps to maintain the client's personal dignity and locus of control.
- Emotional support: part of missing nursing care; more necessary for dying clients, a dying client simply wants an opportunity to express his or her feelings and verbally work through
- Arrangements for care: respecting the rights of dying clients includes helping them to choose how and where they want to receive terminal care.

Helping Dying Clients Cope

NURSING GUIDELINES 38-1

Helping Dying Clients Cope

- Accept the client's behavior, no matter what it is. *Doing so demonstrates respect for individuality.*
- Provide opportunities for the client to express feelings freely. *Giving such opportunities demonstrates an attention to meeting individual needs.*
- Try to understand the client's feelings. *Understanding reinforces the client's uniqueness.*
- Use statements with broad openings such as "It must be difficult for you" and "Do you want to talk about it?" *Such language encourages communication and allows the client to choose the topic or manner of response.*

- Home care: Nurses may help to coordinate community services, secure home equipment, and arrange for home nursing visits.
  - Respite care: relief for the caregiver by a surrogate, important because it gives the caregiver an opportunity to enjoy brief periods away from home.
- Hospice care: The word originally derives from a place of refuge for travelers, which providing the care of terminally ill clients
  - Eligibility for hospice care: 6 months or less to live as certified by a physician

Hospice Services. Most hospice clients receive care in their own homes. A multidisciplinary team of hospice professionals and volunteers supports care given by the family.

Hospice organizations also provide support programs for family members and significant others. They offer individual and group counseling both during and after the client's death to help survivors cope with grief.

Terminating hospice care

- Residential care: form of intermediate care, These facilities provide around-the-clock nursing care for clients who cannot live independently.
- Acute care: sophisticated technology and labor-intensive treatment, if his or her condition is unstable, This form of care is the most expensive.

- Providing terminal care
  - Hydration: maintenance of adequate fluid volume
  - Nourishment: tube feeding and parenteral nutrition
  - Elimination: catheterization; enemas or suppositories; skin care
  - Hygiene: clean, well groomed, and free of unpleasant odors
  - Positioning: promote comfort and circulation
  - Comfort: keep clients free from pain

- Family involvement: maintain family bonds to help coping with future grief
- Approaching death: Decrease and ultimate cessation of function
  - Multiple organ failure: The signs of approaching death are the result of two or more organs cease to function
  - Family notification: family should be aware of approaching death, If death has already occurred, the physician is responsible for contacting the family and releasing that information.
  - Meeting relatives to promote smooth transition

Signs of Multiple Organ Failure

TABLE 38-2 Signs of Multiple Organ Failure

ORGAN	SIGNS
Heart	• Hypotension • Irregular, weak, and rapid pulse • Cold, clammy, and mottled skin
Liver	• Internal bleeding • Edema • Jaundice • Impaired digestion, distention, anorexia, nausea, and vomiting
Lungs	• Dyspnea • Accumulation of fluid ("death rattle")
Kidneys	• Oliguria • Anuria • Pruritus (itching skin)
Brain	• Fever • Confusion and disorientation • Hypoesthesia (reduced sensation) • Hyporeflexia (reduced reflexes) • Stupor • Coma

- **Confirming death:** Determined on the basis that breathing and circulation have ceased, Legally, a physician is responsible for pronouncing a client dead, but in a few states, nurses are authorized to do so.

Confirming death

- **Brain death:** irreversible loss of function of the whole brain (EEG needs to confirm)
- **Death certificate:** A legal document attesting that the person named on the form has been found dead, also indicates the presumptive cause of the person's death.
- **Permission for autopsy:** Examination of organs and tissues of human body after death, It is not necessary after all deaths, but it is useful for determining more conclusively the cause of death.

Age Criteria for Organ Donation

TABLE 38-3 Age Criteria for Organ Donation

ORGAN	AGE RANGE
Kidney	6 months–55 years
Liver	<50 years
Heart	<40 years
Pancreas	2–50 years
Corneas	Any age
Skin	15–74 years

Guidelines established by the Organ Procurement Agency of Michigan, Ann Arbor, MI.

Performing postmortem care: Care of the body after death

- Cleaning and preparing the body to enhance its appearance during viewing at the funeral home
- Proper identification
- Releasing the body to mortuary personnel

Grieving

- Process of feeling acute sorrow over a loss
- **Anticipatory grieving**: Grieving that begins before the loss occurs.
- **Pathologic grief:** dysfunctional grief; refusing to accept the client's death
- **Resolution of grief**: time taken for mourning(الحداد); ability to talk about the dead person; controlling emotions.
- Grief work (activities involved in grieving) includes participating in the burial rituals common to a culture.

Grief response

It is the psychological and physical phenomena experienced by those grieving, it is universal. Psychological reactions commonly are identified as the **stages of grief**:

- **Shock and disbelief:** The refusal to accept that a loved one is about to die or has died.
- **Developing awareness**: The physical and emotional responses such as feeling sick, sad, empty, or angry.
- **Restitution period**: A recognition of the loss.
- **Idealization**: An exaggeration of the good qualities of the deceased

Nursing Implications

Many nursing diagnoses:

- Acute pain.
- fear.
- spiritual distress.
- social isolation.
- ineffective coping.
- decisional conflict.
- hopelessness.
- powerlessness.
- dysfunctional grieving.
- anticipatory grieving.
- caregiver role strain.
- death anxiety.
- chronic sorrow