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Adult Orthopaedic Nursing



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Preface

Adult Orthopaedic Nursing presents the nursing care of musculoskeletal conditions that affect the total adult body, from the neck to the toes, to provide the knowledge and skills necessary for a nurse to care for adult patients with common musculoskeletal conditions. Major conditions, and their potential complications, are presented through the use of the nursing process and clinical pathways, with numerous pictures and illustrations. The narrative portion of the book presents the content in a straightforward, easy to read style, and provides important information regarding the theory and principles underlying orthopaedic nursing. Nursing interventions are presented in step-by-step fashion with detailed instructions on how to do specific procedures. The numerous illustrations reinforce the written text and assist the nurse in mastering the procedures. The focus of the book is on preoperative care, postoperative care, and preparation for home care and rehabilitation. Where appropriate, the discussion also includes the care of outpatients in the clinic or physician's office, with follow-up home care and rehabilitation instructions.

Chapter 1 presents a brief historical review of orthopaedics and the major factors influencing orthopaedic nursing care. That chapter also presents a discussion of nursing care management focusing on the use of the nursing process and clinical pathways, the conceptual approaches that are utilized throughout the book.

Chapter 2, *Assessment of an Orthopaedic Patient*, presents taking a health history, doing a comprehensive physical assessment of the trunk and extremities, and implementing diagnostic procedures. The physical examination portion presents techniques for (1) testing range of motion, (2) measuring muscle mass and extremity length, (3) testing reflexes, and (4) assessing neurovascular status. In addition, diagnostic procedures (e.g., joint aspiration, biopsies, arthroscopies, x-ray examinations, and blood and urine tests) are discussed.

Chapter 3, *Musculoskeletal Pathology*, presents a brief overview of the major pathological conditions affecting the musculoskeletal system and the basic knowledge needed for clinical practice, including a discussion of such conditions as arthritis (rheumatoid arthritis, osteoarthritis, and gouty arthritis), infectious

conditions (tuberculosis and osteomyelitis), neoplasms (both benign and malignant), and other pathological processes (osteoporosis, osteomalacia, and Paget's disease). In contrast to the later anatomical chapters, Chapter 3 gives a broader view of each condition and how it affects the entire body. General symptomatology, diagnostic tests, treatment methods, and complications are discussed. After the overview, arthritis (rheumatoid and osteoarthritis) and infectious conditions (tuberculosis and osteomyelitis) are discussed in relation to how the pathology affects specific areas of the body. That more specific discussion helps the nurse to understand exactly how each pathology affects specific joints, how to assess for each condition, and the specific treatment methods utilized.

Chapter 4 presents a discussion on the effects of trauma on the musculoskeletal system. It examines soft tissue trauma (including contusions, strains, sprains, and dislocations) and fractures, including first-aid measures, methods of repair, and complications related to fractures. The chapter discusses complications from imposed immobility and ways to restore ambulation through the use of assistive devices. There is a lengthy discussion, with numerous pictures, of the different types of crutches and walkers, how to measure and prepare the patient for using crutches, canes, or walkers, a demonstration of the different gaits, and how to ambulate up and down stairs. This comprehensive coverage will be a help to nurses on inpatient units, in the trauma area, and in outpatient and physician offices, as well as to home care and geriatric nurses.

Chapters 5 and 6 present discussions of the different types of casts and traction, with detailed nursing care. Chapter 5 presents information on the different types of casts and splints, providing step-by-step instructions on cast application, cast removal, and how to prevent potential complications. Nursing management of these patients is presented in a nursing process for each specific type of cast, demonstrating the hospital and home care of the patient. Numerous pictures are presented to assist the nurse in the application and care of patients with a cast or splint. Chapter 6 presents an in-depth discussion of the major types of traction, including the step-by-step process of traction application, how to

move and care for a patient in traction, and patient exercises specific for the type of fracture and traction apparatus. Nursing management of these patients is presented as a nursing process for each specific traction, including both hospital and home care. Numerous pictures are presented to assist the nurse in traction application and nursing care.

Chapters 7 and 14 present information regarding external fixation devices and amputations respectively. Generic nursing processes are presented to illustrate the nursing care for those patients. Chapter 7 presents a discussion of the different types of external fixation devices, the nursing care involved, and potential complications. Chapter 14 focuses on the nursing and rehabilitation process for different levels of amputations.

Chapters 8 through 13 focus on the care of specific areas of the body: the back and pelvis; hip and upper thigh; knee; ankle and foot; hand and wrist; and elbow and shoulder. In each chapter there is a discussion of the different pathologic and traumatic conditions, treatment methods, and nursing management. Nursing management is organized within a nursing process and is followed by a generic clinical pathway.

The book is appropriate for use by nurses new to orthopaedics, non-orthopaedic nurses caring for orthopaedic patients in an acute care setting (e.g.

medical/surgical units), subacute care nurses, home care nurses, rehabilitation nurses, geriatric care nurses, outpatient care nurses, orthopaedic clinic or physician office practice nurses, as well as undergraduate student nurses learning the basic care of orthopaedic patients. It can also serve as a resource book for hospital units, nursing homes and extended care facilities (specifically those caring for patients following total joints and fractured hips) and home health care providers. The book is an excellent resource for faculty teaching students in orthopaedics, medical/surgical nursing, and geriatrics. The book would also be appropriate for students at the graduate level who want to specialize in orthopaedics.

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Chapter

1

Orthopaedic Nursing Today

The health care industry in the United States has experienced numerous changes in recent decades as the result of scientific, demographic, economic, and political developments. The industry's restructuring, downsizing, and rightsizing reflect (1) the increasing age of the population, (2) the changing pattern of diseases, (3) the changing diversity of the population, and (4) the rising cost of health care. The health care system has been pressed to increase its efficiency and effectiveness. As a result, there has been an increase in outpatient care services, a decrease in length of hospital stays, an increase in the amount of care provided in the home, and an expansion of the role of the nurse. Nursing has been changing to meet these new demands.

Nursing care is now provided to orthopaedic patients in a larger number of settings. These include acute care, extended care, inpatient and outpatient care, subacute care, nursing home, home care, ambulatory care, operating room, and office facilities. In different practice areas, nursing care is carried out through different organizational structures. Some areas use team nursing, which had its origins in the 1950s and 1960s; others employ more recent forms of care delivery such as primary nursing and case management.

Primary nursing (not to be confused with primary health care) refers to comprehensive, individualized care that is provided by the same nurse throughout the course of care. It allows the nurse to implement the practitioner and leadership roles while providing direct patient care, rather than managing and supervising the functions of others who provide the care. The nursing process, the problem-solving model utilized by nurses, gained prominence at the same time as primary nursing, though it is applicable in all settings. The nursing process comprises the assessment of the patient, the formulation of a nursing diagnosis, the formulation of patient-centered goals, the planning of nursing care, the implementation of nursing interventions, the evaluation of outcomes of care, and the reassessment of nursing care based on that evaluation (American Nurses Association, 1975). Today the steps utilized by nurses are less formal but still include assessment, nursing diagnosis, planning and implementing nursing interventions based on the nursing diagnosis, and the evaluation of outcomes of care.

In the early 1990s, the case management model, utilized in the public health sector, was brought into the acute care setting. Case management is a method for coordinating health care services to provide cost-effectiveness, accountability, and quality care. It has gained prominence in part because of shorter hospital stays coupled with rapid and frequent transfers from specialty to standard care units. The role of the nurse manager, instead of emphasizing direct patient care, focuses on managing the care of a number of patients and collaborating with all members of the health team who care for those patients.

With the expansion of managed care nationwide, a new approach to health care has developed: critical pathways. The critical pathways tool represents the interdisciplinary treatment plan and includes vital elements designed to both positively affect patient outcomes and promote timely care delivery (Leininger, 1996). The tool is used for tracking a patient's progress with respect to the achievement of positive outcomes within a specified time frame. It identifies certain key events that must occur for the desired outcome to be attained in a timely manner. With case management and the use of critical pathways, patients and the care they receive are continually assessed from preadmission to discharge and, in many cases, postdischarge as well. Thus, nurses utilize both the nursing process and critical pathways to provide effective, cost-contained, continuity of care.

This chapter presents a brief historical perspective on orthopaedics, the major factors influencing orthopaedic nursing, and the nursing management of the orthopaedic patient.

HISTORICAL PERSPECTIVE ON ORTHOPAEDICS

Orthopaedics is derived from two Greek words, *orthos* meaning "straight" and *paidos* meaning "child." It was introduced in 1741 by Nicholas Andre in a two-volume work entitled *Orthopaedia, or The Art of Correcting and Preventing Deformities in Children*. The first Orthopaedic Institute was founded in Switzerland in 1780.

For many years, orthopaedic practitioners were known as “strap-and-buckle” doctors because of the appliances they used to straighten body and limbs. In Liverpool, Hugh Owen Thomas (1834–1891, see Fig. 1–1) became known for his ability to set broken bones and reduce dislocated joints. A number of appliances in use today, including the Thomas splint, bear his name. His nephew, Sir Robert Jones (1857–1933), was an orthopaedic surgeon who helped to establish orthopaedic surgery as a specialty. In the United States, orthopaedic surgery was pioneered by Dr. Virgil P. Gibney, Surgeon-in-Chief of the New York Hospital for the Ruptured and Crippled; and, in 1887, the American Orthopaedic Association was founded as a professional society for orthopaedic surgeons.

Relatively little is known about the pioneers of orthopaedic nursing, but one name, Agnes Hunt (1862–1948), stands out. Known as the “Florence Nightingale of orthopaedic nursing,” she suffered an orthopaedic deformity in childhood but went on to open the “Baschurch Home” in Oswestry, England, in 1900. From modest beginnings, the home grew into a large orthopaedic hospital with a school for training orthopaedic nurses.

The first professional association of orthopaedic nurses in the United States, the Orthopedic Nurses Association (ONA), was not established until 1972. The ONA dissolved and was succeeded in 1980 by the National Association of Orthopaedic Nurses (NAON).



Figure 1–1 Hugh Owen Thomas. (Callaghan, et. al. (1998). *The Adult Hip*. Philadelphia: Lippincott. p. 358.)

NAON seeks to meet the professional needs of orthopaedic nurses by promoting high standards of practice, encouraging continuing education, and furthering research in orthopaedic nursing.

MAJOR FACTORS INFLUENCING ORTHOPAEDIC NURSING CARE

Six important factors influence orthopaedic nursing care. They are (1) Standards of Practice, (2) philosophy of rehabilitation, (3) aging, (4) nutrition, (5) health teaching, and (6) interrelations between the musculoskeletal system and the rest of the body.

STANDARDS OF PRACTICE

Standards of Practice are objective criteria established by the profession by which the quality of nursing practice can be measured. Since 1973, the American Nurses Association (ANA) Congress for Nursing Practice and several ANA Divisions of Practice (e.g., Medical-Surgical, Gerontological, and Community Health) have published materials setting forth the baselines of acceptable practice, the rationales for the establishment of those Standards, and the specific criteria by which practice in any setting can be evaluated to determine whether the Standards are being met.

The Standards emphasize the nursing process as the means by which nursing care should be delivered. Although the setting in which care is provided and the observable outcomes of care are considered, the focus of the Standards is on evaluating the implementation of the nursing process. The Standards state that to implement the nursing process effectively, nurses should (1) base nursing practice on principles and theories of biophysical and behavioral sciences; (2) continuously update knowledge and skills, applying new knowledge generated by research, changes in health care delivery systems, and changes in social profiles; (3) determine the range of practice by considering the patient's needs, the nurse's competence, the setting for care, and the resources available; and (4) ensure patient and family participation in health promotion, maintenance, and restoration. The Standards explicitly recognize that ongoing revisions of their contents will be necessary to reflect changes in the scope of practice and the extent of knowledge.

Standards of Orthopaedic Nursing Practice were established by the National Association of Orthopaedic Nurses (NAON) and the ANA Division of Medical-Surgical Practice in 1975 and revised in 1996. (From those Standards, NAON also has developed Guidelines for Orthopaedic Nursing for future publication.) Orthopaedic nursing practice was defined as the nursing care of individuals with known and/or predicted neuromusculoskeletal alterations. Orthopaedic nursing takes into account related physiological, social, and behavioral problems resulting from or affecting the individual's

response and adjustment to the neuromusculoskeletal alterations. Modern orthopaedic nursing has moved well beyond dealing with broken or malformed bones. It has grown rapidly as technological innovations have expanded the field of orthopaedics, which today is one of the most demanding and challenging fields of nursing practice.

PHILOSOPHY OF REHABILITATION

Rehabilitation has been defined as the restoration of the individual to the fullest physical, mental, social, vocational, and economic capacity attainable. Broadly speaking, rehabilitation seeks to prevent further disability, to maintain the patient's remaining abilities, and to restore lost functions. It is a dynamic process that begins with the onset of a disabling injury or disease and continues throughout its presence.

A disabling injury or disease is one of three major types: temporary, permanent, or progressive. A temporary disability is typically one of short duration, with rapid improvement and ultimate removal of all etiological factors, for example, recovery from a simple fracture. In a permanent disability, the individual never fully regains premorbid levels of function, as in the case of an amputation following trauma. A progressive disability is a nontemporary affliction that produces a continuing and irreversible loss of function. As is the case in rheumatoid arthritis, there may be periods of both exacerbation and remission, but the patient never returns to premorbid status.

In all types of disabling injury or disease, the patient goes through a period of adjustment and even grieving. Those psychological stages of adaptation to a disability are closely related to those described in the literature on death and dying. Five stages are usually described: psychological shock, denial, depression, anxiety, and acceptance. The stages may overlap, there may be progression and regression, and the length in any stage may vary from days to months and even years. Not all individuals go through all of the stages, but most exhibit grief, which is believed to be necessary to adapt to a disability. Only by carefully observing the patient's behavior can the nurse determine the stage the patient is in and help the patient through to final acceptance. Some individuals may require the assistance of a mental health professional to assist in the adjustment. The nurse must show a willingness to listen and talk about the disability.

A number of factors can affect the impact of a disability and how a person will move through the five stages of adjustment. Significant personal characteristics include (1) age and sex, (2) marital/family status, (3) occupation, (4) educational level, and (5) personality before the disability. Significant characteristics of the disability include (1) suddenness of onset, (2) severity and prognosis, and (3) degree of physical dependency. Important environmental factors include (1) the degree of family and community support available and (2) the financial resources available. The role of the patient's family and significant others is often crucial. They, like the nurse, should adopt

the philosophy that "It is never how high one rises that determines one's merit, but rather how far one has come, considering the difficulties" (Brenner & Suddarth, 1980, p. 179).

SOCIETAL AGING

Orthopaedic nurses provide care to patients of all ages, race/ethnic groups, and socioeconomic statuses. However, the bulk of the patients who receive care related to fractured hips, joint replacements, amputations, arthritis, and osteoporosis are 65 years and older. A discussion of adult orthopaedic nursing would not be complete without a discussion of the current demographic situation and how it impacts the health care system and orthopaedic nursing.

In 1990, the authors of *Healthy People 2000* presented a profile of the U.S. population for the year 2000. They predicted that (1) the overall population will grow to nearly 270 million people; (2) the median age will increase from 29 years in 1975 to age 36; (3) in contrast to 8% in 1950, there will be 13% of the population (35 million persons) over age 65; and (4) the population of those over age 85 will be about 30% of those over age 65, or some 4.6 million persons. The authors also predicted changes in the race and ethnic composition as (1) whites (excluding Hispanic Americans) will decline from 76% to 72%; (2) Hispanics, the fastest growing population group will rise from 8% to 11.3% (more than 31 million persons); (3) blacks will increase from 12.4% to 13.1%; and (4) other racial groups (including American Indians, Alaska Natives, and Asians and Pacific Islanders) will increase from 3.5% to 4.3% of the total. It is also estimated that the U.S. population will gain some 6 million net migrants over the decade.

The Census Bureau predicts that by the year 2020, the average life expectancy will be 82.0 years for women and 74.2 years for men. It has been customary to use age 65 to define the elderly. With the increase in the percentage of older people, those age 85 and older have been named the "oldest-old" (Fig. 1-2).

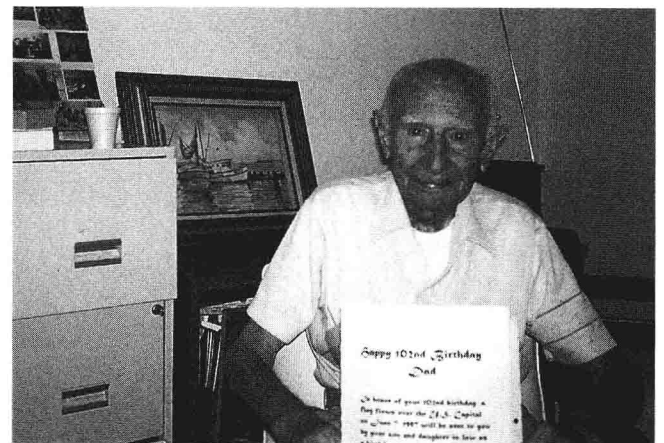


Figure 1-2 Age 102 and still counting. (Courtesy of Robert Schoen.)

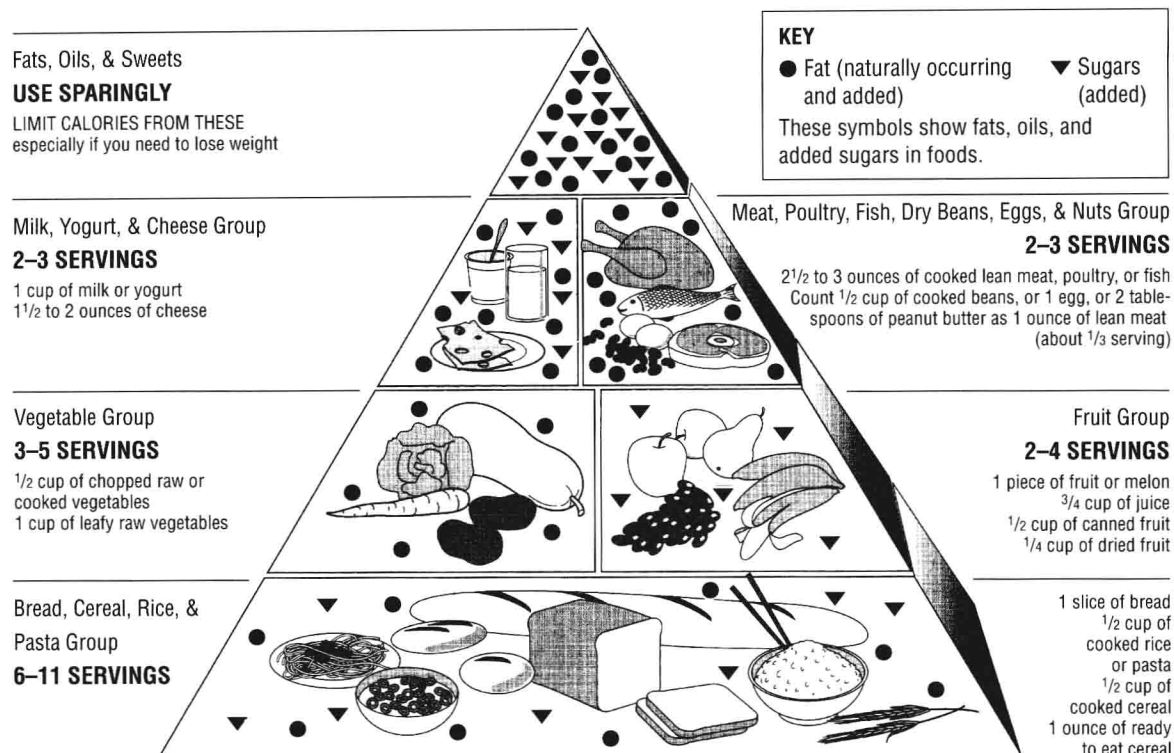


Figure 1-3 The Food Guide Pyramid (serving sizes depicted in boxes). (Dudek, Nutrition Handbook for Nursing Practice, 3/e p. 203.)

With more elderly persons, there will be an increase in hip fractures. It is estimated that 250,000 hip fractures occur in the United States each year. Some have predicted that the number of hip fractures in the elderly will double or even triple over the next 20 years. According to Daleiden (1990), there has been an increase in fractures in individuals living in nursing homes, and each year it is estimated that perhaps one fourth of the elderly living in the community suffer a fracture. The increase in fractures is due primarily to the elderly's predisposition to falling and to the progressive bone loss associated with osteoporosis. Physiological changes of the musculoskeletal system due to aging are that (1) muscle mass and elasticity diminish, resulting in decreased strength and endurance and thus a decrease in reaction time and coordination; (2) bone demineralizes, causing skeletal instability and shrinkage of intervertebral discs resulting in a less flexible spine and spinal curvatures; and (3) joints undergo degenerative changes, resulting in pain, stiffness, and loss of range of motion. As people age, they tend to develop a stooped posture (kyphosis) and a shuffling and broad-based gait. The change in gait, slowed reflexes, and loss of muscle strength make it difficult to prevent a fall. Medications (e.g., antihypertensives and diuretics), sensory impairments, confusion, and an unsafe environment (e.g., slippery and uneven walking surfaces, unstable railings, loose rugs, and inadequate lighting) increase the risk for falls. Other pathologies (e.g., osteoporosis, osteoarthritis) related to aging are discussed in Chapter 3.

NUTRITION

A good diet is important in preventing and managing musculoskeletal problems. A well-balanced diet, rich in proteins and minerals, will help maintain the structure of the bones and muscles. Daily food guidelines for nutritional support provided by the U.S. Departments of Agriculture and Health and Human Services (Edge & Miller, 1994) are (1) 6-11 servings from the bread, cereal, rice, and pasta groups; (2) 2-4 servings from the fruit group; (3) 3-5 servings from the vegetable group; (4) 2-3 servings from the meat, poultry, fish, dry beans, eggs, and nuts group; (5) 2-3 servings from the milk, yogurt, and cheese group; and (6) sparing use of fats, oils, and sweets (Fig. 1-3).

Factors influencing body weight include intake of food, activity, size and body type, metabolism, and genetics. Weight gain occurs when energy intake (food) exceeds energy output. It is necessary to know the individual's basal metabolic rate (BMR) in order to determine calories needed to maintain, reduce, or increase weight. First, obtain the person's height and weight and then determine the person's activity level (i.e., calories expended in muscular movement during a typical day). Activity levels are as follows: (1) sedentary (e.g., desk job, sitting during most of work or leisure time), 40% to 50%; (2) light activity (e.g., teacher, assembly line worker or walks 2 miles regularly), 55% to 65%; (3) moderate activity (e.g., waitress), 65% to 70%; and (4) heavy activity (e.g., construction worker), 75% to 100%. Calculations for

Box 1-1 Calculating the Basal Metabolic Rate

Using the example of a 154-lb, 5'2" woman with a sedentary lifestyle:

1. Convert body weight to kilograms:
 $154 \text{ lbs} \div 2.2 = 70 \text{ kg}$
2. Multiply weight by the gender constant:
 $70 \text{ kg} \times 0.9 \text{ cal/kg/h} = 63 \text{ cal/h}$
3. Multiply calories per hour by 24 hr (day):
 $63 \text{ cal/h} \times 24 \text{ h} = 1,512 \text{ cal/24 h}$
4. The BMR is 1,512 calories per day.
5. Multiply the BMR by the level of activity:
 $1,512 \times 0.40 = 604.8$
 $1,512 \times 0.50 = 756.0$
6. Add BMR calories to the level of activity calories to get total:
 $1,512 + 604.8 (756.0) = 2,116.8 (2,268) \text{ calories}$

estimating an individual's BMR use different constants for men and women. The constant for men is one calorie per kilogram (2.2 lbs) per hour and for women 0.9 calorie per kilogram per hour. Consider a woman 5 feet 2 inches tall weighing 154 pounds with a sedentary activity level. To determine the total calories required to maintain that body weight, follow the steps shown in Box 1-1 (Edge & Miller, 1994, p. 276). To decrease her weight, she would need to reduce that number of calories and/or increase her activity level.

It has been recommended that an older women should reduce her caloric intake to 1,800 calories until age 75 and to 1,600 calories thereafter; for the older man, the recommendations are for 2,400 calories, reduced to 2,050 after age 75. However, it must be emphasized that these figures are general guidelines only, and each person will have a unique caloric need based on individual body size, metabolism, health status, and activity level.

The diet for elderly persons should reflect a lower quantity and higher quality of food, and should include fewer carbohydrates and fats. The decreased ability of the older person to maintain a regular blood glucose level emphasizes the need for reduced carbohydrate intake. A high carbohydrate diet can stimulate an abnormally high release of insulin, leading to hypoglycemia. At least one gram of protein per kilogram of body weight is necessary for the renewal of body protein and protoplasm and for the maintenance of enzyme systems. Protein supplements may be added to the older person's diet to meet that daily requirement.

With the reduced amount of intracellular fluid available in the older person, attention must be given to ensuring a good fluid intake. The usual recommended fluid consumption for an older adult is from 1,500 to

2,000 ml daily. (Note if there is any fluid restriction due to other health problems.)

Although the ability to absorb calcium decreases with age, calcium is still required in the diet to maintain a healthy musculoskeletal system and to promote the proper functioning of the body's blood-clotting mechanisms. The use of calcium supplements may benefit the older person but needs to be discussed with a physician to ensure that other medical problems do not contraindicate them.

HEALTH TEACHING

Health teaching should take into account the perceptions, feelings, and specific needs of the learner, and should be responsive to feedback. Learning is the development of new behavior patterns as a result of acquiring new knowledge, skills, or attitudes. Learning is active, not passive, and requires the full participation of the learner. It is through the teaching-learning process that the nurse assists patients in acquiring necessary behaviors to meet their own health needs. Although adults are certainly not a homogeneous group, there are four basic principles of adult learning that are broadly applicable (Kidd, 1973). These are that (1) adult learners see themselves as responsible, self-directing, capable individuals who will resent being treated like children; (2) adults have accumulated a great many experiences on which to base new learning, but some of those experiences may interfere with new learning; (3) adults are interested in learning what is relevant to them "here and now"; and (4) teachers of adult learners should relate to them as individuals with individual needs.

Health teaching is an integral part of health care. It is the responsibility of all nurses, individually and collectively, to provide relevant, effective, and consistent health education to the patient and to the patient's family or significant others. With today's short hospital stays, it is imperative for nurses and other members of the health care team to take every opportunity, no matter what the setting, to teach patients about their health care. For patients having elective surgery, both the initial nursing assessment and organized patient teaching need to be done in the physician's office or outpatient clinic.

Health teaching requires a well-developed plan that includes (1) an assessment of the patient's needs and readiness for health teaching, (2) a diagnosis of why and in what areas the patient is deficient in knowledge, (3) a formulation of short- and long-term educational goals, (4) planning to properly present the material to the patient, (5) intervention in carrying out the presentation, (6) an evaluation of the effectiveness of the presentation by such means as written or verbal responses or a return demonstration, and (7) a reassessment to renew the effort if the goals are not met. In other words, the nursing process is central to health teaching as it is to all other aspects of nursing care.