

An anatomical illustration of the human torso, showing the ribcage and spine. The illustration is rendered in a light, translucent style, highlighting the skeletal structure. The spine is visible in the center, with the ribs curving outwards. The shoulders and upper arms are also visible on either side.

SECTION **The Profession**



CHAPTER **Fundamentals**

1

The Guide to Physical Therapist Practice

*The Guide to Physical Therapist Practice*¹ was developed by the American Physical Therapy Association (APTA) “to encourage a uniform approach to physical therapist practice and to explain to the world the nature of that practice.”¹ *The Guide for Conduct of the Physical Therapist Assistant, The Standards of Practice for Physical Therapy, and The Standards of Ethical Conduct for the Physical Therapist Assistant* are provided in the appendices.

● **Key Point** The *Guide*¹ has defined physical therapy as follows: “Physical therapy includes diagnosis and management of movement dysfunction and enhancement of physical and functional abilities; restoration, maintenance, and promotion of optimal physical function, optimal fitness and wellness, and optimal quality of life as it relates to movement and health; and prevention of the onset, symptoms, and progression of impairments, functional limitations, and disabilities that may result from diseases, disorders, conditions, or injuries.”

*The Guide to Physical Therapist Practice*¹ is divided into two parts:

- Part 1 delineates the physical therapist’s scope of practice and describes patient management.
- Part 2 describes each of the diagnostic preferred practice patterns of patients typically treated.

Within the *Guide*, physical therapy is defined as the care and services provided by or under the direction and supervision of a physical therapist. *Physical therapists* are the only professionals who provide physical therapy. It is the function of the physical therapist to

examine the patient; evaluate the data and identify problems; determine the diagnosis, the prognosis, and the plan of care (POC), and implement the POC (intervention).² *Physical therapist assistants* (PTAs), who are under the direction and supervision of the physical therapist (PT), are the only paraprofessionals who assist in the provision of physical therapy interventions. It is the sole responsibility of the physical therapist to determine the most appropriate utilization of the physical therapist assistant that will ensure delivery of service that is safe, effective, and efficient.¹

● Key Point

The American Physical Therapy Association (APTA) House of Delegates (HOD) first authorized the training of physical therapist assistants at its 1967 annual conference by adopting *The Policy Statement on Training and Utilization of the Physical Therapist Assistant*. In 1977, the Commission on Accreditation in Education (CAE), the precursor to the Commission on Accreditation in Physical Therapy Education (CAPTE), was established and recognized by the U.S. Department of Education and by the Council on Postsecondary Accreditation. The activities of the CAE included accreditation of programs for the physical therapist assistant.

The role of the PTA has continued to evolve since its conception. According to the APTA's HOD (HOD 06-96-39 and HOD 06-00-16-27), the PTA is specifically defined as “a technically educated health care provider who assists the physical therapist in the provision of physical therapy.... In the contemporary provision of physical therapy services, the physical therapist is considered the professional practitioner of physical therapy, while the physical therapist assistant, educated at the technical level, is considered the paraprofessional. The core function of the PTA is to implement the plan of treatment established by the supervising physical therapist.”

The PTA is governed by a number of factors, including:

- APTA standards.
- Individual state and federal laws regulating practice acts, including administrative rules for practice. Supervision of the PTA may be spelled out separately from other support personnel, or the PTA may be included in language that defines supervision for all support personnel. When the state laws do not delineate supervision requirements, PTs should rely on the APTA guidelines. State regulations always supersede the APTA guidelines.

- Specifications of entitlement programs such as Medicare.

● Key Point

The efficient and effective function of the PTA relies on strong interpersonal communication skills between patient and physical therapist, keen observation, and sound clinical decision-making. Much about becoming an effective clinician relates to an ability to communicate with the patient, the patient's family, and the other members of the healthcare team.

Members of the Healthcare Team

The physical therapist assistant (PTA) is only one vital member of the rehabilitation team and is responsible and accountable to the other members of the team (**Table 1-1**).³ The responsibility for patient care is shared by the entire rehabilitation team and by the patient.

Practice Settings

PTAs practice in a broad range of inpatient, outpatient, and community-based settings, including those listed in **Table 1-2**.

Models of Disablement

A disablement model is designed to detail the functional consequences and relationships of disease, impairment, and functional limitations of the patient (**Table 1-3**). The PTA's understanding of the process of disablement, and the factors that affect its development, is crucial to achieving the goal of restoring or improving function and reducing disability in the individual. *The Guide to Physical Therapist Practice*² employs terminology from the Nagi disablement model,⁴ but also describes its framework as being consistent with other disablement models.⁵ In 1980 the Executive Board of the World Health Organization published a document for trial purposes, the International Classification of Functioning, Disability and Health (ICFDH-I or ICF) (refer to Table 1-3). In 2001, a revised edition was published (ICFDH-II) that emphasized “components of health” rather than “consequences of disease” (i.e., participation rather than disability) and environmental and personal factors as important determinants of health.⁶

TABLE**1-1****Potential Key Members of the Orthopedic Rehabilitation Team**

Personnel	Description
Orthopedic surgeon	The orthopedic surgeon performs surgery for conditions involving the musculoskeletal system. Orthopedic surgeons use both surgical and nonsurgical approaches to treat musculoskeletal trauma, sports injuries, degenerative diseases, infections, tumors, and congenital disorders.
Physiatrist	A physiatrist is a physician specializing in physical medicine and rehabilitation who has been certified by the American Board of Physical Medicine and Rehabilitation. The primary role of the physiatrist is to diagnose and treat patients with disabilities involving musculoskeletal, neurological, cardiovascular, or other body systems.
Primary care physician (PCP)	The primary care physician, usually an internist, general practitioner, or family medicine physician, provides primary care services and manages routine healthcare needs. Most PCPs serve as gatekeepers for the managed-care health organizations—provide authorization for referrals to other specialty physicians or services, including physical therapy.
Chiropractor (DC)	A chiropractor is a doctor trained in the science, art, and philosophy of chiropractic. A chiropractic evaluation and treatment is directed at providing a structural analysis of the musculoskeletal and neurologic systems of the body. According to chiropractic doctrine, abnormal function of these two systems may affect function of other systems in the body. In order to practice, chiropractors are usually licensed by a state board.
Physical therapy director	A physical therapy director: <ul style="list-style-type: none"> • Is typically a physical therapist who has demonstrated qualifications based on education and experience in the field of physical therapy and who has accepted the inherent responsibilities of the role • Establishes guidelines and procedures that will delineate the functions and responsibilities of all levels of physical therapy personnel in the service and the supervisory relationships inherent to the functions of the service and the organization • Ensures that the objectives of the service are efficiently and effectively achieved within the framework of the stated purpose of the organization and in accordance with safe physical therapist practice • Interprets administrative policies • Acts as a liaison between line staff and administration • Fosters the professional growth of the staff
Staff physical therapist (PT)	The staff physical therapist: <ul style="list-style-type: none"> • Is responsible for the examination, evaluation, diagnosis, prognosis, and intervention of patients • Assists in the supervision of physical therapy personnel in the service All states require physical therapists to obtain a license to practice.
Physical therapist assistant (PTA)	The physical therapist assistant: <ul style="list-style-type: none"> • Works under the supervision of a physical therapist • Provides care such as teaching patients/clients exercise for mobility, strength, and coordination; training for activities such as walking with crutches, canes, or walkers; and implementing adjunctive interventions • May modify an intervention only in accordance with changes in patient status and within the established plan of care developed by the physical therapist • Typically has an associate's degree from an accredited PTA program and is licensed, certified, or registered in most states
Physical therapist/occupational therapist (PT/OT) aide	The physical therapist/occupational therapist aide: <ul style="list-style-type: none"> • May be involved in support services directed by PTs and PTAs • Receives on-the-job training and is permitted to function only with continuous on-site supervision by a physical therapist or in some cases a physical therapist assistant • Is limited to performing methods and techniques that do not require clinical decision-making or clinical problem-solving by a physical therapist or a physical therapist assistant

(continued)

TABLE**1-1****Potential Key Members of the Orthopedic Rehabilitation Team (continued)**

Personnel	Description
PT and PTA student	The PT or PTA student can perform duties commensurate with his or her level of education. The PT clinical instructor (CI) is responsible for all actions and duties of the affiliating student, and can supervise both physical therapy and physical therapist assistant students (a PTA may only supervise a PTA student—not a PT student).
Volunteer	A volunteer is a member of the community who has an interest in assisting with rehab departmental activities. Responsibilities include taking phone messages, and basic nonclinical/secretarial duties. Volunteers may not provide or setup patient treatment, transfer patients, clean whirlpools, or maintain equipment.
Occupational therapist (OT)	An occupational therapist assesses functioning in activities of everyday living, including dressing, bathing, grooming, meal preparation, writing, and driving, which are essential for independent living. The minimum educational requirements for the registered occupational therapist are described in the current <i>Essentials and Guidelines of an Accredited Educational Program for the Occupational Therapist</i> (AOTA, 1991a). All states require an OT to obtain a license to practice.
Certified OT assistant (COTA)	A certified OT assistant: <ul style="list-style-type: none">• Works under the direction of an occupational therapist• Performs a variety of rehabilitative activities and exercises as outlined in an established treatment plan The minimum educational requirements for the COTA are described in the current <i>Essentials and Guidelines of an Accredited Educational Program for the Occupational Therapy Assistant</i> (AOTA, 1991b)
Certified orthotist (CO)	A certified orthotist designs, fabricates, and fits orthoses (braces, splints, collars, corsets), prescribed by physicians, to patients with disabling conditions of the limbs and spine. A CO must have successfully completed the examination of the American Orthotist and Prosthetic Association.
Certified prosthetist (CP)	A certified prosthetist designs, fabricates, and fits prostheses for patients with partial or total absence of a limb. A CP must have successfully completed the examination of the American Orthotist and Prosthetic Association.
Physician's assistant (PA)	A physician's assistant is a medically trained professional who can provide many of the health care services traditionally performed by a physician, such as taking medical histories and doing physical examinations, making a diagnosis, and prescribing and administering therapies.
Nurse practitioner (NP)	A nurse practitioner is registered nurse with additional specialized graduate-level training who performs physical exams and diagnostic tests, counsels patients, and develops treatment programs.
Athletic trainer (ATC)	A certified athletic trainer is a professional specializing in athletic health care. In cooperation with the physician and other allied health personnel, the athletic trainer functions as an integral member of the athletic health care team in secondary schools, colleges and universities, sports medicine clinics, professional sports programs, and other athletic healthcare settings. Certified athletic trainers have, at minimum, a bachelor's degree, usually in athletic training, health, physical education, or exercise science.

TABLE

1-2

Practice Settings

Setting	Characteristics
Hospital	<p>An institution whose primary function is to provide inpatient diagnostic and therapeutic services for a wide variety of medical, surgical, and nonsurgical conditions. In addition, most hospitals provide some outpatient services, particularly emergency care. Hospitals may be classified in a number of ways, including by:</p> <ul style="list-style-type: none"> • Length of stay (short-term or long-term) • Teaching or nonteaching • Major types of services: psychiatric, tuberculosis, general, and other specialties, such as maternity, pediatric, or ear, nose, and throat (ENT) • Type of ownership or control: federal, state, or local government; for-profit and nonprofit
Primary care	<p>Basic or entry-level of health care that includes diagnostic, therapeutic, or preventive services. Care is provided on an outpatient basis by primary-care physicians, including family practice physicians, internists, and pediatricians.</p>
Secondary care	<p>Services provided by medical specialists, such as cardiologists, urologists, and dermatologists, who generally do not have first contact with the patients. This level of care may require inpatient hospitalization or ambulatory same-day surgery.</p>
Tertiary care (tertiary health care)	<p>Highly specialized care that is given to patients in a hospital setting who are in danger of disability or death (organ transplants, major surgical procedures). Services provided often require sophisticated technologies (e.g., neurosurgeons or intensive care units). Specialized care is usually provided because of a referral from primary or secondary medical care personnel.</p>
Transitional care unit	<p>Non-medically based facility, which may be in group home or part of a continuum of rehabilitation center. The typical stay is 4 to 8 months. A greater focus placed on compensation versus restoration.</p>
Skilled nursing facility (SNF)	<p>A freestanding facility, or part of a hospital, that is licensed and approved by the state (Medicare certified) where eligible individuals receive skilled nursing care and appropriate rehabilitative and restorative services. Sometimes referred to as an <i>extended care facility</i>. An SNF accepts patients in need of rehabilitation and medical care that is of a lesser intensity than that received in the acute care setting of a hospital and provides skilled nursing, rehabilitation, and various other health services on a daily basis. Medicare defines <i>daily</i> as seven days a week of skilled nursing care and five days a week of skilled therapy. Physician orders must be rewritten every 60 days.</p>
Acute rehabilitation facility	<p>Usually based in a medical setting. An acute rehabilitation facility provides early rehabilitation, social, and vocational services as soon as the patient is medically stable. Primary emphasis is to provide intensive physical and cognitive restorative services in the early months to disabled persons to facilitate their return to maximum functional capacity. Typical stay is 3 to 4 months (short term).</p>
Chronic care facility	<p>Long-term care facility that is facility- or community-based. Sometimes referred to as <i>extended rehabilitation</i>. Designed for patients with permanent or residual disabilities caused by a non-reversible pathological health condition. Chronic care facilities are also used for patients who demonstrate slower than expected progress. Used as a placement facility—stays can be 60 days or longer, but not permanent.</p>
Comprehensive outpatient rehabilitation facility (CORF)	<p>CORFs must provide coordinated outpatient diagnostic, therapeutic, and restorative services, at a single fixed location, to outpatients for the rehabilitation of injured, disabled, or sick individuals. CORFs are surveyed every six years at a minimum.</p>
Custodial care facility	<p>Provides medical or nonmedical services that do not seek to cure, but which are necessary for the patient who is unable to care for him- or herself. Custodial care facilities provide care during periods when the medical condition of the patient is not changing and care for patients who do not require the continued administration of medical care by qualified medical personnel. This type of care is not usually covered under managed-care plans.</p>

(continued)

TABLE**1-2****Practice Settings (continued)**

Setting	Characteristics
Hospice care	A facility or program that is licensed, certified, or otherwise authorized by law that provides supportive care for the terminally ill. Hospice care focuses on the physical, spiritual, emotional, psychological, financial, and legal needs of the dying patient and the family. Services provided by an interdisciplinary team of professionals and perhaps volunteers in a variety of settings, including hospitals, freestanding facilities, and at home. Medicare and Medicaid require that at least 80% of hospice care is provided at home. Eligibility for reimbursement includes: <ul style="list-style-type: none"> • Medicare eligibility • Certification of terminal illness (less than or equal to six months of life) by physician
Personal care	Optional Medicaid benefit that allows a state to provide services to assist functionally impaired individuals in performing the activities of daily living (e.g., bathing, dressing, feeding, grooming).
Ambulatory care (outpatient care)	Includes outpatient preventative, diagnostic, and treatment services that are provided at medical offices, surgery centers, or outpatient clinics (including private practice physical therapy clinics, outpatient satellites of institutions or hospitals). Outpatient care is designed for patients who do not require overnight hospitalization. More cost effective than inpatient care, and therefore favored by managed-care plans.

TABLE**1-3****Disablement Model Comparisons**

WHO/The International Classification of Functioning, Disability and Health (ICFDH-I)	NAGI Scheme	WHO/The International Classification of Functioning, Disability and Health (ICFDH-II)
<i>Disease</i> The intrinsic pathology or disorder	<i>Pathology/Pathophysiology</i> Interruption or interference with normal processes and efforts of an organism to regain normal state	<i>Health Condition</i> Dysfunction of a body function and/or structure
<i>Impairment</i> Loss or abnormality of psychological, physiologic, or anatomic structure or function	<i>Impairment</i> Anatomic, physiologic, mental or emotional abnormalities or loss	<i>Impairment</i> Problems in body function or structure such as a significant deviation or loss
<i>Disability</i> Restriction or lack of ability to perform an activity in a normal manner	<i>Functional Limitation</i> Limitation in performance at the level of the whole organism or person	<i>Activity Limitation</i> Limitation in execution of a task or action by an individual
<i>Handicap</i> Disadvantage or disability that limits or prevents fulfillment of a normal role (depends on age, sex, socio-cultural factors for the person)	<i>Disability</i> Limitation in performance of socially defined roles and tasks within a socio-cultural and physical environment	<i>Participation Restriction</i> Prevents fulfillment of involvement in a life situation

Abbreviation: WHO: World Health Organization.

● Key Point

Note the following definitions:

- **Impairment:** Loss or abnormality of anatomic, physiologic, or psychologic structure or function. Not all impairments are modifiable by physical therapy, and not all impairments cause activity limitations and participation restrictions.¹
- **Primary impairment:** An impairment resulting from active pathology or disease. Primary impairment can create secondary impairments and can lead to secondary pathology. Examples include loss of sensation, loss of strength.
- **Secondary impairment:** An impairment that originates from primary impairment and pathology.¹ Examples include pressure sores, contractures, and cardiovascular deconditioning. When an impairment is the result of multiple underlying causes and arises from a combination of primary or secondary impairments, the term *composite impairment* is sometimes used.⁷ For example, a patient who sustained a fracture of the tibial plateau and whose knee was immobilized for several weeks is likely to exhibit a balance impairment of the involved lower extremity after the immobilization has been removed. It is important to be able to recognize functionally relevant impairments, as not all impairments are necessarily linked to functional limitations or disability.
- **Functional limitation:** A restriction of the ability to perform, at the level of the whole person, a physical action, activity, or task in an efficient, typically expected, or competent manner.¹

● Key Point

An example using the above definitions:

- **Pathology/pathophysiology:** Osteoarthritis of the hip.
- **Impairment:** Loss of range of motion at the hip; muscle weakness in the lower extremity.
- **Related functional limitation:** Slow, painful gait; inability to ambulate 20 feet in 9 seconds; inability to rise from chair; inability to ascend/descend 10 steps.
- **Disability:** Patient is unable to leave house.

The Five Elements of Patient/Client Management

● Key Point

Note the following definitions:

- **Patient:** Person with diagnosed impairments or functional limitations.
- **Client:** Person who is not necessarily diagnosed with impairments or functional limitations, but seeks services for prevention or promotion of health, wellness, and fitness.

The PTA must be aware of the sequence, organization, and administration of an examination performed by the PT. This awareness increases the PTA's understanding of the rationale for the decision-making and plan of care. The five elements of patient/client management include:²

1. Examination of the patient
2. Evaluation of the data and identification of problems

3. Determination of the diagnosis
4. Determination of the prognosis and plan of care (POC)
5. Implementation of the POC (intervention)

Throughout the patient's plan of care, the PTA must communicate changes in the patient status relative to data from the initial examination and make safe and appropriate modifications to the existing program based on consultation with the supervising PT.

Examination

The examination is an ongoing process that begins with the patient referral or initial entry and continues throughout the course of the rehabilitation program. The process of examination includes gathering information from the chart, other caregivers, the patient, the patient's family, caretakers, and friends in order to identify and define the patient's problem(s).⁸ The examination consists of three components of equal importance—patient history, systems review, and tests and measures.² These components are closely related in that they often occur concurrently. One further element, observation, occurs throughout.

● Key Point

A continual assessment with each treatment session by the PTA allows the PT to evaluate progress and modify interventions as appropriate.² It is not unusual for patients to neglect to provide the PT with information pertinent to their condition during the examination, often because they feel it is irrelevant. If such information is provided to the PTA, the PTA must decide whether the information needs to be communicated to the PT.

Patient History

Obtaining the patient history involves the gathering of information from the review of the medical records and interviews with the patient, family members, caregiver, and other interested persons about the patient's history and current functional and health status.⁹

● Key Point

It is estimated that 80% of the information needed to explain the presenting patient problem can be obtained through a thorough history.¹⁰

Systems Review

The systems review is a brief or limited examination that provides additional information about the general health and the continuum of patient/client care throughout the lifespan.

Tests and Measures

The tests and measures portion of the examination involves the physical examination of the patient and provides the PT with objective data to accurately determine the degree of specific function and dysfunction.⁹ A number of recognized tests and measures are commonly performed, but not all are used every time—the physical examination may be modified by the PT based on the patient history and the systems review.

Numerous special tests exist for each area of the body. These tests are performed by the PT only if there is some indication that they would be helpful in confirming or implicating a particular structure or providing information as to the degree of tissue damage.

• Key Point

In the joints of the spine, examples of special tests include directional stress tests (posterior–anterior pressures and anterior, posterior, and rotational stressing), joint quadrant testing, vascular tests, and repeated movement testing. Examples of special tests in the peripheral joints include ligament stress tests (i.e., Lachman for the anterior cruciate ligament), articular stress testing (valgus stress applied at the elbow), and rotator cuff impingement tests.

It is important to remember that the interpretation of the findings from the special tests depends on the sensitivity and specificity of the test, the skill and experience of the PT, as well as the PT's degree of familiarity with the tests.

Evaluation

Following the history, systems review, and the tests and measures, the PT makes an evaluation based on an analysis and organization of the collected data and information.³ An evaluation uses judgment to make sense of the findings in order to identify a relationship between the symptoms reported and the signs of disturbed function.¹¹ The evaluation process may also identify possible problems that require consultation with, or referral to, another provider.

Diagnosis

Diagnosis, as performed by a PT, refers to a cluster of signs and symptoms, syndromes, or categories. It is used to guide the PT in determining the most appropriate intervention strategy for each patient.¹² A physical therapy diagnosis includes a prioritization of the identified impairments, functional limitations, and disabilities.

Prognosis and Plan of Care

The prognosis, determined by the PT, is the predicted level of optimum function that the patient will attain and an identification of the barriers that may impact the achievement of optimal improvement (age,

medications, socioeconomic status, comorbidities, cognitive status, nutrition, social support, medical prognosis, and environment) within a certain time frame.³ This prediction helps guide the intensity, duration, frequency, and type of the intervention, in addition to providing justifications for the intervention. Knowledge of the severity of an injury, the age, physical and health status of a patient, and the healing processes of the various tissues involved are among the factors used by the PT in determining the prognosis. The plan of care (POC), which outlines anticipated patient management, involves the setting of goals, coordination of care, progression of care, and discharge (**Table 1-4**). The POC:¹²

- Is based on the examination, evaluation, diagnosis, and prognosis, including the predicted level of optimal improvement
- Includes statements that identify anticipated goals and the expected outcomes
- Describes the specific interventions to be used, and the proposed frequency and duration of the interventions that are required to reach the anticipated goals and expected outcomes
- Includes documentation that is dated and appropriately authenticated by the PT who established the plan of care
- Includes patient and family (as appropriate) goals, and a focus on patient education
- Includes plans for discharge of the patient/client, taking into consideration achievement of anticipated goals and expected outcomes, and provides for appropriate follow-up or referral

• Key Point

Communication between clinician and patient begins when the clinician first meets the patient, continues throughout any additional sessions, and involves *interacting with the patient* using terms he or she can understand.

• Key Point

From the patient's point of view, there is no substitute for interest, acceptance, and especially empathy on the part of the clinician.¹² Empathy is the capability to share and understand another human being's emotions and feelings.

Intervention

According to the *Guide to Physical Therapist Practice*,³ an intervention is “the purposeful and skilled interaction of the PT and the patient/client and, when appropriate, with other individuals involved in the patient/client care, using various physical therapy procedures and techniques to produce changes in the condition consistent with the

TABLE**1-4****Essential Data Collection Skills for Carrying Out a Plan of Care****Aerobic Capacity and Endurance**

Measures standard vital signs

Recognizes and monitors responses to positional changes and activities

Observes and monitors thoracoabdominal movements and breathing patterns with activity

Anthropometrical Characteristics

Measures height, weight, length, and girth

Arousal, Mentation, and Cognition

Recognizes changes in the direction and magnitude of patient's state of arousal, mentation, and cognition

Assistive, Adaptive, Orthotic, Protective, Supportive, and Prosthetic Devices

Identifies the individual's and caregiver's ability to care for the device

Recognizes changes in skin condition while using devices and equipment

Recognizes safety factors while using the device

Gait, Locomotion, and Balance

Describes the safety, status, and progression of patients while engaged in gait, locomotion, and balance

Integumentary Integrity

Recognizes absent or altered sensation

Recognizes normal and abnormal integumentary changes

Joint Integrity and Mobility

Recognizes normal and abnormal joint movement

Muscle Performance

Measures muscle strength by manual muscle testing

Observes the presence or absence of muscle mass

Recognizes normal and abnormal muscle length

Recognizes changes in muscle tone

Pain

Administers standardized questionnaires, graphs, behavioral scales, or visual analog scales for pain

Recognizes activities, positioning, and postures that aggravate or relieve pain or altered sensations

Posture

Describes resting posture in any position

Recognizes alignment of trunk and extremities at rest and during activities

Range of Motion

Measures functional range of motion

Measures range of motion using a goniometer

Applicable Standards

3.3.2.9. Adjusts interventions within the plan of care established by the physical therapist in response to patient clinical indications and reports this to the supervising physical therapist.

3.3.2.10. Recognizes when intervention should not be provided due to changes in the patient's status and reports this to the supervising physical therapist.

3.3.2.11. Reports any changes in the patient's status to the supervising physical therapist.

3.3.2.12. Recognizes when the direction to perform an intervention is beyond that which is appropriate for a physical therapist assistant and initiates clarification with the physical therapist.

3.3.2.13. Participates in educating patients and caregivers as directed by the supervising physical therapist.

3.3.2.14. Provides patient-related instruction to patients, family members, and caregivers to achieve patient outcomes based on the plan of care established by the physical therapist.

3.3.2.15. Takes appropriate action in an emergency situation.

3.3.2.16. Completes thorough, accurate, logical, concise, timely, and legible documentation that follows guidelines and specific documentation formats required by state practice acts, the practice setting, and other regulatory agencies.

3.3.2.17. Participates in discharge planning and follow-up as directed by the supervising physical therapist.

3.3.2.18. Reads and understands the healthcare literature.

Data from Accreditation Handbook PTA Criteria Appendix A-32.

diagnosis and prognosis.” The purpose of a rehabilitative intervention is to improve the tolerance of a healing tissue to tension and stress, and to ensure that the tissue has the capacity to tolerate the various stresses that will be placed on it. As an example, with contractile tissues, such as the muscles, this can be accomplished through measured rest, rehabilitative exercise, high-voltage electrical stimulation, central (cardiovascular) aerobics, general conditioning, and absence from overuse.¹³

● Key Point

Three components make up the physical therapy intervention:³

1. Coordination, communication, and documentation. Many interventions involve other healthcare disciplines:
 - *Multidisciplinary approach*: Each discipline involved retains its methodologies and assumptions without change or development from other disciplines within the multidisciplinary relationship. An example would be a team meeting that includes the physician, case manager, PT, occupational therapist (OT), and nurse to discuss a patient’s care and progress.
 - *Interdisciplinary approach*: This approach blends the practices and assumptions of each discipline involved. An example would be a patient being co-treated in physical and occupational therapy.
 - *Transdisciplinary approach*: This approach crosses many disciplinary boundaries to create a holistic approach. Under this approach, the role differentiation between disciplines is defined by the needs of the situation rather than by discipline-specific characteristics. An example would be addressing the variety of needs in a patient with cerebral palsy (CP).
2. Patient/client-related instruction.
3. Direct interventions (e.g., manual therapy techniques, therapeutic exercise). Procedural interventions can be broadly classified into three main groups:^{7,9}
 - *Restorative interventions*: These interventions are directed toward remediating or improving the patient’s status in terms of impairments, functional limitations, and recovery of function.
 - *Compensatory interventions*: These interventions are directed toward promoting optimal function using residual abilities.
 - *Preventative interventions*: These interventions are directed toward minimizing potential impairments, functional limitations, and disabilities and maintaining health.

The inert structures, such as ligaments and menisci, rely more on the level of tension and force placed on them for their recovery, which stimulates the fibroblasts to produce fiber and glycosaminoglycans.¹⁴ Thus, the intervention chosen for these structures must involve the repetitive application of modified tension in the line of stress based on the stress of daily activities, or sporting activity.¹⁴

● Key Point

The most successful intervention programs are those that are custom designed from a blend of clinical experience and scientific data. The level of improvement achieved is related to accurate goal setting and the attainment of those goals.

The therapeutic strategy is determined solely from the responses obtained from tissue loading and the effect that loading has on symptoms. Once these responses have been determined, the focus of the intervention is to provide sound and effective self-management strategies for patients that avoid harmful tissue loading.¹⁵

Interventions are typically aimed at addressing short- and long-term goals, both of which are dynamic in nature, being altered as the patient’s condition changes, by designing strategies with which to achieve those goals. Intervention strategies can be subdivided into active (direct) or passive (indirect), with the goal being to make the intervention as active as possible at the earliest opportunity.

Cultural Influences

It is important that clinicians are sensitive to cultural issues in their interactions with patients. Cultural influences shape the framework within which people view the world, define and organize reality, and function in their everyday life. In many cases individuals group themselves on the basis of cultural similarities, and, as a result, form cultural groups.

● Key Point

Ethnocentrism is the tendency to believe that one’s ethnic or cultural group is centrally important, and that all other groups are measured in relation to one’s own. The ethnocentric individual will judge other groups relative to his or her own particular ethnic group or culture, especially with concern to language, behavior, customs, and religion. An example would be a patient believing he or she would receive a better level of care from a clinician of the same race and religion.

Cultural groups share behavioral patterns, symbols, values, beliefs, and other characteristics that distinguish them from other groups. At the group level, cultural differences are generally variations of differing emphasis or value placed on particular practices. Whenever possible, the PTA should use any available resource, such as an interpreter.

Patient Education

Patient education is an important component of the plan of care. According to the *Accreditation Handbook*, PTA Criteria, Appendix A-3, the PTA:

3.3.2.19. Under the direction and supervision of the physical therapist, instructs other members of the health care team using established

techniques, programs, and instructional materials commensurate with the learning characteristics of the audience.

3.3.2.20. Educates others about the role of the physical therapist assistant.

Motivation

PTAs should keep in mind that for patients, motivation plays a critical role; success is more motivating than is failure. Basic principles of motivation are applicable to learning in any situation:

- The environment can be used to focus the patient's attention on what needs to be learned.
- Interesting visual aids, such as booklets, posters, or practice equipment, motivate learners by capturing their attention and curiosity.
- Incentives, including privileges and receiving praise from the educator, motivate learning. Both affiliation and approval are strong motivators.
- Internal motivation is longer lasting and more self-directive than is external motivation, which must be repeatedly reinforced by praise or concrete rewards. However, some individuals have little capacity for internal motivation and must be guided and reinforced constantly.
- Learning is most effective when an individual is ready to learn—that is, when one wants to know something.

Maslow's Hierarchy of Needs

Another helpful framework to consider in relation to patient education is Abraham Maslow's hierarchy of needs. This concept is based on a hierarchy of biogenic and psychogenic needs that humans must progress through. Maslow hypothesizes that the higher needs in this hierarchy come into focus only when all the needs that are lower down in the pyramid are mainly or entirely satisfied. Maslow's hierarchy is often depicted as a pyramid consisting of five levels (Figure 1-1). The lower levels (physiological and safety needs) are referred to as *deficiency needs*, and the top three levels (love/belonging, status, and self-actualization needs) are referred to as *being needs*. According to Maslow, in order for an individual to progress up the hierarchy to the being needs, his or her deficiency needs must be met. Growth forces create upward movement in the hierarchy, whereas regressive forces push predominant needs further down the hierarchy.

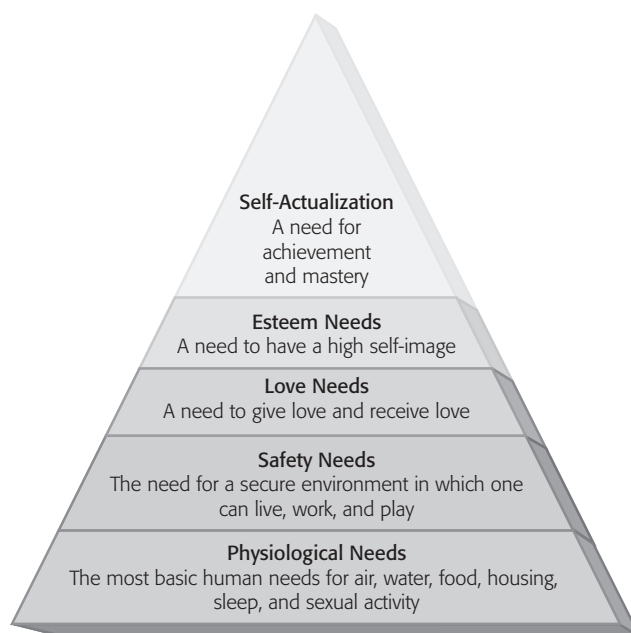


Figure 1-1 Maslow's hierarchy of needs.

Key Point Various studies have found that compliance with physical therapy programs is approximately 40%.¹⁶ Compliance can be improved by:¹⁷⁻¹⁹

- Involving the patient in the intervention planning and goal setting
- Setting realistic goals for both the short and the long term
- Promoting high expectations regarding final outcome
- Promoting perceived benefits
- Projecting a positive attitude
- Providing clear instructions and demonstrations with appropriate feedback
- Keeping the exercises pain-free or with a low level of pain
- Encouraging patient problem solving

Theories of Learning

A vast array of learning theories have been developed over the years. **Table 1-5** outlines some of the more common theories of learning.

Domains of Learning

Bloom²⁰ identified three domains of learning:

- **Cognitive:** Primarily concerned with knowledge and the development of intellectual skills, including the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories (knowledge, comprehension, application, analysis, synthesis, and evaluation) starting from the simplest behavior and moving to the most complex. The simplest

TABLE

1-5

Learning Theories

Theory	Principal Elements	Strategies
Androgeny (Adult Learning)	<p>Adults need to know why they need to learn something.</p> <p>Adults need to learn experientially.</p> <p>Adults approach learning as problem-solving.</p> <p>Adults learn best when the topic is of immediate value.</p>	<p>There is a need to explain why specific things are being taught (e.g., certain commands, functions, operations).</p> <p>Instruction should be task-oriented instead of memorization—learning activities should be in the context of common tasks to be performed.</p> <p>Instruction should take into account the wide range of different backgrounds of learners; learning materials and activities should allow for different levels/types of previous experience with computers.</p> <p>Since adults are self-directed, instruction should allow learners to discover things for themselves, providing guidance and help when mistakes are made.</p>
Behaviorist (Stimulus–Response Theory)—Operant Conditioning	<p>Learning is a function of a change in overt behavior.</p> <p>Changes in behavior are the result of an individual’s response to events (stimuli) and their consequences that occur in the environment.</p> <p>The response of one behavior becomes the stimulus for the next response.</p> <p>Learning occurs when an individual engages in specific behaviors in order to receive certain consequences (learned association).</p> <p>Behavior can be controlled or shaped by operant conditioning.</p>	<p>Desired or correct behaviors are identified so that frequent and scheduled reinforcements (positive reinforcement) can be given to reinforce the desired behaviors. Negative behaviors are ignored (negative reinforcement) so that these behaviors become weakened to the point where they disappear (extinction). Negative consequences are administered to individuals who perform undesirable behaviors (punishment).</p> <p>Reinforcement frequency and schedules:</p> <ul style="list-style-type: none"> • <i>Continuous reinforcement</i>: A behavior is reinforced every time it occurs. • <i>Partial reinforcement</i>: A behavior is reinforced intermittently. • <i>Fixed interval</i>: The period of time between the occurrences of each instance of reinforcement is fixed or set. • <i>Variable interval</i>: The period of time between the occurrences of each instance of reinforcement varies around a constant average.
Experiential Learning	<p>Two types of learning:</p> <ol style="list-style-type: none"> 1. <i>Cognitive (meaningless)</i>: academic knowledge such as learning vocabulary or multiplication tables. 2. <i>Experiential (significant)</i>: applied knowledge such as personal change and growth. 	<p>Significant learning takes place when the subject matter is relevant to the personal interests of the student.</p> <p>Learning that is threatening to the self (e.g., new attitudes or perspectives) are more easily assimilated when external threats are at a minimum.</p> <p>Learning proceeds faster when the threat to the self is low. Self-initiated learning is the most lasting and pervasive.</p>

ones must be mastered first before progressing to the more complicated ones.

- **Affective**: Primarily concerned with emotions, values, and attitudes, including feelings, values, appreciation, enthusiasms, and motivations. There are five specific levels (receiving, responding, valuing, organization, and characterization).
- **Psychomotor**: Primarily concerned with physical action and motor skills, including coordination. The seven major categories of this domain include perception, set, guided response, mechanism, complex overt response, affectation, and origination.

Types of Learners

Litzinger and Osif²¹ organized individuals into four main types of learners, based on instructional strategies:

- **Accommodators**: Look for the significance of the learning experience. These learners enjoy being active participants in their learning and will ask many questions, such as, “What if?” and “Why not?”
- **Divergers**: Motivated to discover the relevancy of a given situation and prefer to have information presented in a detailed, systematic, and reasoned manner.

- *Assimilators*: Motivated to answer the question, “What is there to know?” These learners like accurate, organized delivery of information, and they tend to respect the knowledge of the expert. They are perhaps less instructor-intensive than some other types of learners and will carefully follow prescribed exercises, provided a resource person is clearly available and able to answer questions.
- *Convergers*: Motivated to discover the relevancy, or “how,” of a situation. The instructions given to this type of learner should be interactive, not passive.

Other learning styles include:

- *Visual*: Assimilate information by observation, using visual cues and information such as pictures, anatomic models, and physical demonstrations.
- *Auditory*: Prefer to learn by having things explained to them verbally.
- *Tactile*: Learn through touch and interaction; is the most difficult of the three groups to teach. Close supervision is required with this group until they have demonstrated to the clinician that they can perform the exercises correctly, and independently. Proprioceptive neuromuscular facilitation (PNF) techniques, with the emphasis on physical and tactile cues, often work well with this group.

Practice and Feedback

Behavioral psychology emphasizes practice variables in sensory-motor skills such as massed (concentrated—concentrating the learning or practice in a short period of time) versus spaced (distributed—spreading out the learning or practice over a longer period of time) practice, part versus whole task learning (learning parts of a skill versus the whole skill), and feedback/reinforcement schedules.

Long-term retention of motor skills depends upon regular practice. Learning and retention of sensory-motor skills is improved by both the quantity and quality of feedback (knowledge of results) during training. Two ways in which learning/teaching of motor skills can be facilitated include:

1. Slowing down the rate at which the information is presented
2. Reducing the amount of information that needs to be processed

Some form of guided learning seems most appropriate when high proficiency on a new skill

is involved. In contrast, if the task is to be recalled and transferred to a new situation, then some type of problem-solving strategy may be better. Guided learning may be most effective in early training, while learning through trial and error is important in advanced training.

There is evidence that mental rehearsal, especially involving imagery, facilitates performance. This may be because it allows additional memory processing related to physical tasks (e.g., the formation of schema) or because it maintains arousal or motivation for an activity. Many forms of sensory-motor behavior are learned by imitation, especially complex movements such as dance, crafts, or manual therapy techniques.

Education

The strengths and weaknesses of various presentation methods are outlined in **Table 1-6**. A number of guidelines when using visual aids are outlined in **Table 1-7**.

Specific Approaches for Education

The various patient types encountered by the PTA respond differently to teaching methods:

- *Infants/children*: Sessions need to be short and interactive, and they should include structured play and frequent breaks.
- *Adolescents*: It is important to establish whether the adolescent patient is comfortable in the presence of a parent/guardian during therapy sessions.
- *Adults*: Adults need to learn experientially. They generally approach learning as problem-solving, and they learn best when the topic is of immediate value.
- *Elderly*: Special attention is required to identify any signs of visual or hearing loss. Group sessions are often more beneficial than one-on-one sessions.

Documentation

Documentation of the assessment and intervention processes is an important part of any therapeutic regimen. Documentation in health care includes any entry made in the patient/client record. As a record of client care, documentation provides useful information for the clinician, other members of the healthcare team, and third-party payers. The APTA is committed to developing and improving

TABLE**1-6****Teaching Methods**

Teaching Method	Strengths	Weaknesses	Preparation
Lecture	<ul style="list-style-type: none"> Presents factual material in direct, logical manner Contains experience that inspires Useful for large groups 	<ul style="list-style-type: none"> Experts are not always good teachers Audience is passive Learning is difficult to gauge Communication is one way 	<ul style="list-style-type: none"> Needs clear introduction and summary Needs time and content limit to be effective Should include examples, anecdotes
Videotapes/slides	<ul style="list-style-type: none"> Entertaining way of teaching content (colorful) and raising issues Keeps group's attention Looks professional Stimulates discussion Demonstrates three-dimensional movement 	<ul style="list-style-type: none"> Can raise too many issues to have a focused discussion Discussion may not have full participation Only as effective as following discussion Can be expensive 	<ul style="list-style-type: none"> Need to set up equipment Effective only if facilitator prepares questions to discuss after the show
Discussion	<ul style="list-style-type: none"> Pools ideas and experiences from group Effective after a presentation, film, or experience that needs to be analyzed Allows everyone to participate in an active process 	<ul style="list-style-type: none"> Not practical with more than 20 people Few people can dominate Others may not participate Time consuming Can get off the track 	<ul style="list-style-type: none"> Requires careful planning by facilitator to guide discussion Requires question outline

Data from Dutton M: McGraw-Hill's National Physical Therapy Examination (ed 1). New York, McGraw-Hill, 2009

TABLE**1-7****Guidelines for the Use of Visual Aids**

Flip Charts	Slides
<ul style="list-style-type: none"> Choose a chart size that is appropriate for the design, your height, and the size of the audience. Draw the art to fit the vertical shape of the chart. Make the lettering dark enough and large enough to be read by everyone in the audience. During preparation, leave several blank pages between each one to allow for corrections and additions. For the final presentation, remove all but one blank page at the beginning so that you can turn to that blank page when there is no relevant visual. Securely attach the chart to the easel and adjust the easel height for the presentation. When writing on the flip chart, don't speak to the chart. 	<ul style="list-style-type: none"> Slides should be used instead of flip charts if the group is large. Design the visuals for continuous viewing and as notes. Maintain continuity—have all slides horizontal or vertical, not mixed. Allow sufficient production time. Place no more than 15 words per slide. Use black or blue background with bright colors. Check the position and order of the slide in the carousel tray or PowerPoint. Use a conventional pointer. Keep as many lights on as possible.

Data from Dutton M: McGraw-Hill's National Physical Therapy Examination (ed 1). New York, McGraw-Hill, 2009

the art and science of physical therapy, including practice, education, and research. To help meet these responsibilities, the APTA Board of Directors has approved a number of guidelines for physical therapy documentation. These guidelines are intended

as a foundation for the development of more specific guidelines in specialty areas, while at the same time providing guidance across all practice settings. In all instances, it is the position of the APTA that the physical therapy examination, evaluation, diagnosis,

prognosis, and intervention shall be documented, dated, and authenticated by the PT or PTA as appropriate. The APTA's Documentation Guidelines are as follows:

- The documentation must be consistent with the APTA's Standards of Practice.
- All documentation must be legible and use medically approved abbreviations or symbols.
- All documentation must be written in black or blue ink, and the mistakes must be crossed out with a single line through the error, initialed, and dated by the PTA.
- Each intervention session must be documented. The patient's name and identification number must be on each page of the documentation record.
- Informed consent for the interventions must be signed by a competent adult. If the adult is not competent, the consent must be signed by the patient/client's legal guardian. If the patient is a minor, the consent must be signed by the parent or an appointed guardian.
- Each document must be dated and signed by the PT/PTA using the first and the last name and the professional designation; professional license number may be included but can be optional.
- All communications with other healthcare providers or healthcare professionals must be recorded.
- The PTA student's notes should be cosigned by the PTA (clinical instructor) or by the PT (clinical instructor).
- Nonlicensed personnel notes should be cosigned by the PT.

● Key Point

Medical records must be properly stored and be accessed only by the appropriate staff. If the patient is present and has the capacity to make healthcare decisions, a healthcare provider may discuss the patient's health information with a family member, friend, or other person if the patient agrees or, when given the opportunity, does not object. However, a healthcare provider may not discuss a patient's condition with a patient's family member if the patient has stated he or she does not want the family to know about his or her condition.

The SOAP (Subjective, Objective, Assessment, Plan) note format has traditionally been used to document the examination and intervention process.

- *Subjective*: Information about the condition from patient or family member.
- *Objective*: Measurement a clinician obtains during the physical examination.

- *Assessment*: Analysis of problem, including the long- and short-term goals.
- *Plan*: A specific intervention plan for the identified problem.

More recently, the Patient/Client Management format is being used by clinicians familiar with the *Guide to Physical Therapist Practice*.⁸ The Patient/Client Management model described in the *Guide to Physical Therapist Practice* has the following components:

- *History*: Information gathered about the patient's history.
- *Systems review*: Information gathered from performing a brief examination or screening of the patient's major systems addressed by physical therapy; also includes information gathered about the patient's communication, affect, cognition, learning style, and education needs.
- *Tests and measures*: Results from specific tests and measures performed by the PT.
- *Diagnosis*: Includes a discussion of the relationship of the patient's functional deficits to the patient's impairments and/or disability as determined by the PT, as well as a discussion of other healthcare professionals to which the PT has referred the patient or believes the patient should be referred.
- *Prognosis*: Includes the predicted level of improvement that the patient will be able to achieve according to the PT and the predicted amount of time to achieve that level of improvement. The prognosis should also include the PT's professional opinion of the patient's rehabilitation potential.
- *Plan of care*: Includes the Expected Outcomes (Long-Term Goals), Anticipated Goals (Short-Term Goals), and Interventions, including an Education Plan for the patient or the patient's care givers or significant others.

The purposes of documentation are as follows:⁸

- To document what the clinician does to manage the individual patient's case.
- To record examination findings, patient status, intervention provided, and the patient's response to treatment.
- To communicate with all other members of the healthcare team; this helps provide consistency among the services provided and includes communication between the PT and the PTA.

- To provide information to third-party payers, such as Medicare and other insurance companies who make decisions about reimbursement based on the quality and completeness of the physical therapy note.
- To be used for quality assurance and improvement purposes and for issues such as discharge planning.
- To serve as a source of data for quality assurance, peer and utilization review, and research.

Key Point The physical therapy documentation is considered a legal document, and it becomes a part of the patient's medical record.

The PTA reads the initial documentation of the examination, evaluation, diagnosis, prognosis, anticipated outcomes and goals, and intervention plan, and is expected to follow the POC as outlined by the PT in the initial patient note.⁸ After the patient has been seen by the PTA for a period of time (the time varies according to the policies of each facility or healthcare system and state law), the PTA must write a progress note documenting any changes in the patient's status that have occurred since the PT's initial note was written.⁸ Also, after a discussion about the diagnosis and prognosis with the PT, expected outcomes, anticipated goals, and interventions, the PTA rewrites or responds to the previously written expected outcomes and documents the revised POC accordingly.⁸ In many facilities (according to the policies of each facility or healthcare system and state law), the PT then cosigns the PTA's notes, indicating agreement with what is documented.⁸

Key Point Students in PT or PTA programs may document when the record is additionally authenticated by the PT or, when permissible by law, documentation by a PTA student may be authenticated by a PTA.

Infection Control

Infection is a process in which an organism establishes a parasitic relationship with its host.²² This invasion and multiplication of microorganisms produces an immune response and subsequent signs and symptoms.

Common signs and symptoms of infectious disease include:

- Fever, chills, and malaise
- Nausea, vomiting

- Headache
- Confusion
- Tachycardia
- Joint effusion and myalgia
- Cough and sore throat

Key Point A great variety of micro-organisms are responsible for infectious diseases, including fungi (yeast and molds), helminths (e.g., tapeworms), mycobacteria, viruses, mycoplasmas, bacteria, rickettsiae, chlamydiae, protozoa, and prions.

Nosocomial (those that originate or occur in a hospital or hospital-like setting) infections can be caused by infections from the:

- Central nervous system
- Surgical site
- Urinary tract
- Respiratory tract
- Bloodstream
- Intestinal tract

Clinicians can help prevent transmission of nosocomial infections from themselves to others, from client to client, and from client to self by following procedures, standard precautions, and proper hand-washing techniques (**Table 1-8**), infection control, and isolation procedures (**Table 1-9** and **Table 1-10**).

Key Point Do not confuse infection and inflammation. *Infection* is the harmful colonization of a host by an infecting organism. *Inflammation* is the complex biological response of vascular tissues to harmful stimuli while initiating the healing process for the tissue.

Various terms are used to describe asepsis techniques:

- **Sterilization:** Destroys all viable microorganisms
- **Disinfection:** Reduces microorganisms
- **Antisepsis:** Inhibits or destroys microorganisms

Key Point Methods of antisepsis include the use of:

- Antiseptic solutions, such as alcohol and iodine
- Germicidal soaps
- Mercurial
- Quaternary ammonia
- Antibacterial additives

The more common infectious diseases are outlined in **Table 1-11**.

TABLE**1-8****Standard Precautions****Hand Washing**

1. Wash hands after touching blood, body fluids, secretions, excretions, and contaminated items, whether or not gloves are worn.
2. Wash hands immediately after removing gloves, between patient contacts, and when otherwise indicated to reduce transmission of microorganisms.
3. Wash hands between tasks and procedures on the same patient to prevent cross-contamination of different body sites.
4. Use plain (nonantimicrobial) for routine hand washing.
5. An antimicrobial agent or a waterless antiseptic agent may be used for specific circumstances (hyperendemic infections) as defined by infection control.

**Hand washing should be performed using water after removing all jewelry. The hands should be washed with soap for at least 30 seconds while avoiding touching any contaminated surface. Rinse thoroughly, using a paper towel barrier when turning off the water.

Gloves

1. Wear gloves (clean, unsterile gloves are adequate) when touching blood, body fluids, secretions, excretions, and contaminated items; put on clean gloves just before touching mucous membranes and nonintact skin.
2. Change gloves between tasks and procedures on the same patient after contact with materials that may contain high concentrations of microorganisms.
3. Remove gloves promptly after use, before touching uncontaminated items and environmental surfaces, and before going on to another patient; wash hands immediately after glove removal to avoid transfer of microorganisms to other patients or environments.

Mask and Eye Protection or Face Shield

1. Wear mask and eye protection or a stay shield to protect mucous membranes of the eyes and nose during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.

Gown

1. Wear a gown (a clean, unsterile gown is adequate) to protect skin and prevent soiling of clothing during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, and excretions.
2. Select a gown that is appropriate for the activity and the amount of fluid likely to be encountered.
3. Remove a soiled gown as soon as possible and wash hands to avoid transfer of microorganisms to other patients or environments.

Patient Care Equipment

1. Handle used patient care equipment soiled with blood, body fluids, secretions, and excretion in a manner that prevents skin and mucous membrane exposures, contamination of clothing, and transfer of microorganisms to other patients or environments.
2. Ensure that reusable equipment is not used for the care of another patient until it has been cleaned and reprocessed appropriately.
3. Ensure that single use items are discarded properly.

Environmental Control

1. Follow hospital procedures for the routine care, cleaning, and disinfection of environmental surfaces, beds, bed rails, bedside equipment, and other frequently touched surfaces.

Linen

1. Handle, transport, and process used linen soiled with blood, body fluids, secretions, and excretion in a manner that prevents skin and mucous membrane exposures and contamination of clothing, and avoids transfer of microorganisms to other patients or environments.

Occupational Health and Blood-Borne Pathogens

1. Prevent injuries when using needles, scalpels, and other sharp instruments or devices; when handling sharp instruments and procedures; when cleaning used instruments; and when disposing of used needles.
2. Never recap used needles, or otherwise manipulate them using both hands, or use any other technique that involves directing the point of the needle toward any part of the body; rather, use either a one-handed "scoop" technique or mechanical device designed for holding the needle sheath.
3. Do not remove used needles from disposable syringes by hand, and do not bend, break, or otherwise manipulate used needles by hand.
4. Place used disposable syringes and needles, scalpel blades, or other sharp items in appropriate puncture-resistant container for transport to the reprocessing area.
5. Use mouthpieces, resuscitation bags, or other ventilation devices as an alternative to mouth-to-mouth resuscitation.

Patient Placement

1. Use a private room for a patient who may contaminate the environment or who does not (or cannot be expected to) assist in maintaining appropriate hygiene or environmental control.
2. Consult Infection Control if private room is not available.

Data from Centers for Disease Control and Prevention, Hospital Infection Control Practices Advisory Committee. Part II: Recommendations for Isolation Precautions in Hospitals, February 1997

TABLE

1-9

Airborne, Droplet, and Contact Precautions

Airborne Precautions

In addition to Standard Precautions, use Airborne Precautions, or the equivalent, with all patients known or suspected to be infected with serious illness transmitted by airborne droplet nuclei (small-particle residue) that remain suspended in the air and that can be dispersed widely by air currents within a room or over a long distance (for example, *Mycobacterium tuberculosis*, measles virus, chickenpox virus).

1. Use a respiratory isolation room.
2. Wear respiratory protection (mask) when entering room.
3. Limit movement and transport of patient to essential purposes only. Mask patient when transporting out of area.

**Personal protective equipment (PPE) includes items (e.g., gowns, masks, gloves, mouthpieces) that are used as barriers to protect against a patient with a potentially infectious disease.

Droplet Precautions

In addition to Standard Precautions, use Droplet Precautions, or the equivalent, for patients known or suspected to be infected with serious illness microorganisms (e.g., mumps, rubella, pertussis, influenza) transmitted by large-particle droplets that can be generated by the patient during coughing, sneezing, talking, or the performance of procedures.

1. Use isolation room.
2. Wear respiratory protection (mask) when entering room.
3. Limit movement and transport of patient to essential purposes only. Mask patient when transporting out of area.

Contact Precautions

In addition to Standard Precautions, use Contact Precautions, or the equivalent, for specified patients known or suspected to be infected or colonized with serious illness transmitted by direct patient contact (and or skin to skin contact) or contact with items in patient environment.

1. Use isolation room.
2. Wear gloves when entering room; change gloves after having contact with infective material; remove gloves before leaving patient's room; wash hands immediately with an antimicrobial agent or waterless antiseptic agent. After glove removal and hand washing, ensure that hands do not touch contaminated environmental items.
3. Wear a gown when entering room if you anticipate your clothing will have substantial contact with the patient, environmental surfaces, or items in the patient's room, or if the patient is incontinent or has diarrhea, ileostomy, colostomy, or wound drainage not contained by dressing. Remove gown before leaving patient's room; after gown removal, ensure that clothing does not contact potentially contaminated environmental surfaces.
4. Use single-patient-use equipment.
5. Limit movement and transport of patient for essential purposes only. Use precautions when transporting patient to minimize risk of transmission of microorganisms to other patients and contamination of environmental surfaces or equipment.

Data from Guidelines for isolation precautions in hospitals. Part II. Recommendations for isolation precautions in hospitals. Hospital Infection Control Practices Advisory Committee. *Am J Infect Control* 24:32–52, 1996

TABLE

1-10

Creating and Maintaining a Sterile Field

Creating

Generally, creating a sterile field involves a sequence of procedures:

1. *Gowning* (putting on sterile, surgical gown). The gown is held firmly away from the sterile field and then shaken so that it unfolds while keeping the hands above waist level. Only the inside of the gown should be touched as both arms are placed into the sleeves up to the sleeve cuffs. The gown is then tied in the back.
2. *Gloving* (putting on sterile, surgical gloves). Using the gown sleeve cuffs as mittens, the glove package is opened. Still using the sleeve cuff as a mitten, the right glove is grasped with the left hand and pulled on over the open end of the gown sleeve. Then, the first three fingers of the right hand reach under the fold of the left glove (touching the sterile portion of the left glove) and hold the glove while the left hand is positioned inside the glove. Once both gloves are donned, the left glove is used to unfold the right glove's cuff.
3. *Applying cap and mask*. Contact with the hair should be avoided while applying the cap, and all hair should be contained within the cap. The mask is applied by first positioning it over the bridge of the nose and securing it using the upper ties behind the head and the lower ties behind the neck.

**A properly gloved and gowned provider's sterile area extends from the chest to the level of the sterile field. Sleeves are sterile from 5 centimeters above the elbow to the cuff.

**Areas below the level of the draped client are considered nonsterile.

TABLE**1-10****Creating and Maintaining a Sterile Field (continued)**

- Maintaining** Place only sterile items within the sterile field (only the top surface of the table or sterile drape is considered sterile; the outer 1 inch of the field is considered nonsterile).
- Open, dispense, and transfer items without contaminating them (the edges of all packaging of sterile items become nonsterile once the package is opened).
- Do not allow unsterile personnel to reach across the sterile field or to touch sterile items.
- Avoid talking, coughing, or sneezing.
- A sterile barrier that has been wet, cut, or torn, should be considered contaminated.
- Do not place sterile items near open windows or doors.
- The sterile field should never be left unattended.
- When in doubt about whether something is sterile, consider it contaminated.

TABLE**1-11****Common Infectious Diseases**

Disease	Description	Mode of Transmission	Prevention
Tuberculosis	A highly contagious bacterial infection caused by <i>Mycobacterium tuberculosis</i> (<i>M. tuberculosis</i>). The lungs are primarily involved, but the infection can spread to other organs.	Tuberculosis can develop after inhaling droplets sprayed into the air from a cough or sneeze by someone infected with <i>M. tuberculosis</i> .	Isolation of infected individuals until cleared from the contagious stage. Despite improved methods of detection and management, tuberculosis remains a worldwide health problem.
Hepatitis	An inflammation of the liver. Several different viruses cause viral hepatitis. They are named the hepatitis A, B, C, D, and E viruses. Some cases of viral hepatitis cannot be attributed to the hepatitis A, B, C, D, or E viruses. These types are called non-A–E hepatitis.	Hepatitis A is transmitted through fecal–oral transmission, contaminated food or water, and infected food handlers. Hepatitis B and C is transmitted through contact with infected body fluids or tissues via oral or sexual contact, blood and blood products exposure, maternal–fetal transmission, and contaminated needles. Hepatitis D spreads through contact with infected blood. This disease occurs only in people who are already infected with hepatitis B. Hepatitis E spreads through contaminated food or water (by feces from an infected person), but it is uncommon in the United States.	Hepatitis A (HAV) can be prevented with good hygiene, washing after using the toilet, sanitation, and immunization. Hepatitis B (HBV) and C (HCV) can be prevented through vaccine, education, lifestyle changes, and healthy habits. There is no cure for HBV.
Acquired immunodeficiency syndrome (AIDS)	The HIV retrovirus chiefly infects human T4 (helper) lymphocytes, the major regulators of the immune response, and destroys or inactivates them. AIDS can result in an increase in opportunistic infections, neurologic dysfunction, and unusual cancers.	The HIV retrovirus is transmitted by body fluids exchange (in particular blood and semen), which is associated with high-risk behaviors (e.g., unprotected sexual contact, needle sharing).	Prevention involves avoidance from high-risk behaviors. AIDS is now considered a chronic rather than a terminal illness.

(continued)

TABLE

1-11

Common Infectious Diseases (continued)

Disease	Description	Mode of Transmission	Prevention
Influenza	One of the most contagious airborne communicable diseases. Results from contamination with 1 of 3 key types of virus, A, B, or C.	Transmitted person-to-person by direct deposition of virus-laden large droplets onto the mucosa of the upper respiratory tract of an immunologically liable person.	All healthcare workers must follow the guidelines for isolation precautions both for themselves and their patients. This is especially important for the clinician treating aged, immunocompromised, or chronically ill individuals.

● Key Point

It is very important for the PTA to be able to recognize the signs and symptoms of infection so that the PT and the patient's physician can be notified immediately. An infection may cause redness, warmth, and inflammation around the affected area, and the area may become stiff, drain pus, and begin to lose range of motion.

Patient Safety

It is extremely important for the PTA to detect malfunctions of the various systems, often referred to as *red flags*, through observation and subjective complaints. Any of the following should cause immediate concern for the PTA, who must consult with the supervising PT or medical personnel:²³

- **Fatigue:** Complaints of feeling tired or run down are extremely common and therefore are significant only if the patient reports that tiredness interferes with the ability to carry out typical daily activities and when the fatigue has lasted for 2 to 4 weeks or longer. Many serious illnesses can cause fatigue.
- **Malaise:** Malaise is a sense of uneasiness or general discomfort that is often associated with conditions that generate fever.
- **Fever/chills/sweats:** These are signs and symptoms that are most often associated with systemic illnesses such as cancer, infections, and connective tissue disorders such as rheumatoid arthritis. To qualify as a red flag, the fever should have some longevity (2 weeks or longer).
- **Unexpected weight change:** A change in weight is a sensitive but nonspecific finding that can be a normal physiologic response, but it may also be associated with depression, cancer, or gastrointestinal disease.
- **Nausea/vomiting:** Persistent vomiting is not usually reported to a PT; patients generally tell their physician. However, the PTA should be aware that a low-grade nausea can be caused by systemic illness or an adverse drug reaction.
- **Dizziness/lightheadedness:** Dizziness (vertigo) is a nonspecific neurologic symptom that requires a careful diagnostic workup. A report of vertigo, although potentially problematic, is not a contraindication to the continuation of the examination. Differential diagnosis includes primary central nervous system diseases, vestibular and ocular involvement, and, more rarely, metabolic disorders.²⁴ Careful questioning can help in the differentiation of central and peripheral causes of vertigo. Dizziness provoked by head movements or head positions could indicate an inner ear dysfunction. Dizziness provoked by certain cervical motions, particularly extension or rotation, also may indicate vertebral artery compromise.
- **Paresthesia/numbness/weakness:** Changes in mentation or cognition can be a manifestation of multiple disorders, including delirium, dementia, head injury, stroke, infection, fever, and adverse drug reactions. The clinician notes whether the patient's communication level is age appropriate, whether the patient is oriented to person, place, and time, and whether his or her emotional and behavioral responses appear to be appropriate to the circumstances.

● Key Point

Indications of domestic abuse include:

- Unexplained bruises or abrasions
- Noncompliance and frequent missing of appointments
- Lack of independent transportation or inability to communicate by phone
- Abusers often accompany their victims to all appointments and refuse to allow the victim to be interviewed alone

Vital Signs

The four so-called *vital* signs, which are standard in most medical settings, are temperature, heart rate, blood pressure, and respiratory rate. Pain is often referred to as the fifth vital sign.

Temperature

Body temperature is one indication of the metabolic state of an individual; measurements provide information concerning basal metabolic state, possible presence or absence of infection, and metabolic response to exercise.²⁵

● Key Point

- “Normal” body temperature of the adult is 98.6°F (37°C). However, temperatures in the range of 96.5°F (35.8°C) to 99.4°F (37.4°C) are not at all uncommon. Fever or pyrexia is a temperature exceeding 100°F (37.7°C).²⁶ At this point, physical therapy should be discontinued.
- Hyperpyrexia refers to extreme elevation of temperature (above 41.1°C or 106°F).²⁵
- Hypothermia refers to an abnormally low temperature (below 35°C or 95°F).
- Normal temperature of an infant is 98.2°F.
- Normal temperature of a child is 98.6°F.
- Normal temperature of an adolescent is 98.6°F.
- In adults over 75 years of age and in those who are immune-compromised (e.g., transplant recipients, corticosteroid users, persons with chronic renal insufficiency, anyone taking excessive antipyretic medications), the fever response may be blunted or absent.²⁵

● Key Point

Caution should be used when prescribing exercises for a patient who has a fever. Exercise should not be attempted if the patient has a temperature of 99.5°F or above, due to the increased stresses placed on the cardiopulmonary and immune systems.

Heart Rate

In most people, the pulse is an accurate measure of heart rate. The heart rate or pulse is taken to obtain information about the resting state of the cardiovascular system and the system’s response to activity or exercise and recovery.²⁵ It is also used to assess patency of the specific arteries palpated and the presence of any irregularities in the rhythm.²⁵

● Key Point

- “Normal” resting adult heart rate (HR): 70 beats per minute (bpm) (range = 60–100).
- Bradycardia: Less than 60 bpm. At <60 bpm, the supervising PT should be informed and the patient should be monitored carefully.
- Tachycardia: More than 100 bpm. At 110 bpm, the supervising PT should be informed and the patient should be monitored carefully.
- Normal HR for an infant: 120 bpm (range = 70–170).
- Normal HR for a child: 125 bpm (range = 75–140).
- Normal HR for an adolescent: 85 bpm (range = 50–100).

Respiratory Rate

The normal chest expansion difference in adults between the resting position and the fully inhaled position is 2 to 4 centimeters (females > males). As per the PT’s instructions, the PTA should compare measurements of both the anterior–posterior diameter and the transverse diameter during rest and at full inhalation.

● Key Point

The following are normal respiratory rates (RR) at rest:

- Adult: 12–18 breaths per minute; at 30 breaths per minute, the supervising PT should be informed and the patient should be monitored carefully
- Infant: 30–50 breaths per minute
- Child: 20–40 breaths per minute
- Adolescent: 15–22 breaths per minute

Blood Pressure

Blood pressure is a measure of vascular resistance to blood flow.²⁵ Arterial blood pressure (BP) is measured by:

- **Systolic pressure:** The pressure exerted on the brachial artery when the heart is contracting.²⁵
- **Diastolic pressure:** The pressure exerted on the brachial artery during the relaxation phase of the heart contraction.²⁵

● Key Point

The values for resting blood pressure in adults are:

- **Normal:** systolic blood pressure <120 mm Hg and diastolic blood pressure <80 mm Hg
- **Prehypertension:** Systolic blood pressure 120–139 mm Hg or diastolic blood pressure 80–90 mm Hg
- **Stage 1 hypertension:** Systolic blood pressure 140–159 mm Hg or diastolic blood pressure 90–99 mm Hg
- **Stage 2 hypertension:** Systolic blood pressure ≥ 160 mm Hg or diastolic blood pressure ≥ 100 mm Hg

The normal values for resting blood pressure in children are:

- **Systolic:** Birth to 1 month, 60–90; up to 3 years of age, 75–130; over 3 years of age, 90–140
- **Diastolic:** Birth to 1 month, 30–60; up to 3 years of age, 45–90; over 3 years of age, 50–80

● Key Point

The signs and symptoms of hypoglycemia (low blood sugar of less than 50 mg/dL) include:

- Sweating, unsteadiness, and weakness
- Increased heart rate and lightheadedness
- Headache, fatigue, and impaired vision
- Clumsiness and tingling sensation in the mouth
- Confusion, pallor, and behavior changes

If the PTA suspects hypoglycemia, the patient should be provided with sugar (½ cup of orange juice, a glass of milk, or 4 or 5 candies). The supervising PT should be notified. Ideally, to prevent such occurrences, the patient exercise program should be planned in conjunction with food intake and insulin administration, and the patient's glucose levels should be checked before exercise.

● Key Point

The signs and symptoms of hyperglycemia (high blood sugar of more than 200 mg/dL) include:

- Fatigue and lethargy
- Blurred vision and dry skin
- Extreme thirst and frequent urination
- Dizziness and increased appetite
- Nausea, vomiting, or abdominal pain

Hyperglycemia can result in ketoacidosis and ultimately a diabetic coma. If hyperglycemia is suspected, the PTA should call for medical assistance, monitor the patient until help arrives, and inform the supervising PT. Ideally, to prevent such occurrences, the patient exercise program should be planned in conjunction with food intake and insulin administration, and the patient's glucose levels should be checked before exercise.

Pain

Concomitant with most soft tissue injuries are pain, inflammation, and edema. Pain serves as a protective mechanism, allowing an individual to be aware of a situation's potential for producing tissue damage, thus minimizing further damage. Pain may be constant, variable, or intermittent. Variable pain is perpetual but varies in intensity. Variable pain usually indicates the involvement of both a chemical and a mechanical source.

● Key Point

One of the simplest methods to quantify the intensity of pain is to use a visual analog scale (VAS). The VAS is a numerically continuous scale that requires the pain level be identified by making a mark on a 100-millimeter line, or by circling the appropriate number in a 0–10 series.²⁷ The patient is asked to rate his or her present pain compared with the worst pain ever experienced, with 0 representing no pain, 1 representing minimally perceived pain, and 10 representing pain that requires immediate attention.²⁸

● Key Point

An emergency situation occurs in the presence of any of the following:

- Absent or decreased breath sounds
- Chest discomfort, shortness of breath, sweating, and and/or faintness
- Abdominal discomfort, nausea, and/or bloody or dark, tarry stools

(Continued)

- Sudden cognitive changes
- Sudden severe headache and facial pain
- BP at 160/100 and/or 90/60 after adjusting for patient/client's age, medications, etc.
- Resting HR at 110 bpm and/or 60 bpm after adjusting for patient/client's age, medications, etc.
- Resting RR at 30 breaths per minute after adjusting for patient/client's age, activity level, medications, etc.

First Aid

Life- or limb-threatening emergencies require rapid assessment, intervention, and transportation to definitive care. Although such events are thankfully uncommon, the clinician must be able to recognize such events and act accordingly. In addition to a working knowledge of basic life support/cardiopulmonary resuscitation (CPR) (see Chapter 6), the clinician should be comfortable with the application of first aid until the local emergency medical services (EMS) or other medical assistance arrives. **Table 1-12** outlines some of the more common situations that require first aid and the appropriate actions to take.

Laboratory Tests and Values

The PTA needs to understand laboratory test values, their variations, their interpretations, and their implications when treating a patient. It is important to remember that false negatives and false positives are associated with laboratory testing, and that the more tests are ordered, the greater the chance that some tests will be false. Many laboratory values can reveal potential precautions for, or contraindications to, therapy, particularly exercise. For example, a patient with diabetes mellitus requires careful monitoring of glucose levels before, during, and after exercise. The purposes of laboratory tests are:

1. To screen for disease or system imbalance (**Table 1-13** and **Table 1-14**)
2. To monitor progress of a disease

Some of the more common laboratory tests, their related physiology, and reference ranges are outlined in **Table 1-15**.

**TABLE
1-12****Situations That Require First Aid and Appropriate Action**

Situation	Description	Appropriate Action
Anaphylaxis	A life-threatening allergic reaction that can cause shock, a sudden drop in blood pressure, and trouble breathing.	<p>Immediately call 911 or facility's emergency number.</p> <p>Ask the person if he or she is carrying an epinephrine autoinjector to treat an allergic attack.</p> <p>Have the person lie still on his or her back, then loosen tight clothing and cover the person with a blanket. Don't give the person anything to drink.</p> <p>If there's vomiting or bleeding from the mouth, turn the person on his or her side to prevent choking. If there are no signs of breathing, coughing, or movement, begin cardiopulmonary resuscitation (CPR).</p>
Burn, including chemical burn	The severity of the burn depends on the extent of damage to body tissues (see Chapter 8).	<p>For minor burns, including first-degree burns and second-degree burns limited to an area no larger than 3 inches (7.6 centimeters) in diameter, cool the burn by holding the burned area under cool (not cold) running water for 10 or 15 minutes or until the pain subsides. If this is impractical, immerse the burn in cool water or cool it with cold compresses. Cooling the burn reduces swelling by conducting heat away from the skin. Don't put ice on the burn. Next, cover the burn with a sterile gauze bandage. Wrap the gauze loosely to avoid putting pressure on burned skin.</p> <p>For major burns (third-degree), call 911 or the facility's emergency number. Until an emergency unit arrives, don't remove burned clothing, but make sure the victim is no longer in contact with smoldering materials or exposed to electricity, smoke, or heat. Do not immerse large severe burns in cold water as this can cause a drop in body temperature (hypothermia) and deterioration of blood pressure and circulation (shock). Cover the area of the burn. Use a cool, moist, sterile bandage; clean, moist cloth; or moist towels. When possible, elevate the burned body part or parts above heart level. Check for signs of circulation (breathing, coughing, or movement). If there is no breathing or other sign of circulation, begin CPR.</p>
Chemical splash in the eye	A number of chemicals used in the clinic can be very corrosive.	<p>Immediately flush the eye with water. Use clean, lukewarm tap water for at least 20 minutes, and use whichever of these approaches is quickest:</p> <p>Get into a shower and, while holding the affected eye or eyes open, aim a gentle stream of lukewarm water on the forehead over the affected eye, or direct the stream on the bridge of the nose if both eyes are affected. Hold your affected eye or eyes open.</p> <p>Placed the head down and turn it to the side. Then ask the person to hold the affected eye open under a gently running faucet.</p>
Choking	Occurs when a foreign object gets lodged in the throat or esophagus, blocking the flow of air.	<p>To confirm that choking is occurring, determine whether the individual is demonstrating an inability to talk, difficulty breathing, or an inability to cough forcefully or whether the skin, lips, and nails are turning blue or dusky.</p> <p>If choking is occurring, first deliver five back blows between the person's shoulder blades with the heel of your hand. Next, perform five abdominal thrusts (Heimlich maneuver). The Heimlich maneuver is performed by standing behind the person and wrapping your arms around his or her waist. Tip the person forward slightly. Making a fist your hand, position it slightly above the person's navel and, while grasping the fist with the other hand, press it hard into the abdomen with a quick, upward thrust (as if trying to lift the person up). Alternate between five back blows and five abdominal thrusts until the blockage is dislodged. If the person becomes unconscious, attempt to remove the blockage and perform CPR.</p>

(continued)

**TABLE
1-12**

Situations That Require First Aid and Appropriate Action (continued)

Situation	Description	Appropriate Action
Fainting	Occurs when the blood supply to the brain is momentarily inadequate, resulting in a temporary loss of consciousness.	Position the person on his or her back. If the person is breathing, restore blood flow to the brain by raising the person's legs above heart level—about 12 inches (30 centimeters)—if possible. Loosen belts, collars, or other constrictive clothing. If the person doesn't regain consciousness within one minute, call 911 or your local emergency number. In addition, check the person's airway to be sure it's clear. If vomiting occurs, turn the patient on his or her side. Check for signs of circulation (breathing, coughing, or movement). If absent, begin CPR. Call 911 or your local emergency number. Continue CPR until help arrives or the person responds and begins to breathe.
Cardiac arrest	Occurs when an artery supplying the heart with blood and oxygen becomes partially or completely blocked. A heart attack generally causes chest pain for more than 15 minutes, but it can also have no symptoms at all.	Call 911 or your local emergency medical assistance number. If possible, have the person chew and swallow an aspirin, unless he or she is allergic to aspirin. Begin CPR.
Heatstroke	The most severe of the heat-related problems, often resulting from exercise or heavy work in hot environments combined with inadequate fluid intake.	Move the person out of the sun and into a shady or air-conditioned space. Call 911 or emergency medical help. Cool the person by covering him or her with damp sheets or by spraying with cool water. Direct air onto the person with a fan or newspaper. Have the person drink cool water or other nonalcoholic beverage without caffeine, if he or she is able.

**TABLE
1-13**

Acid-Base Disorders

Type	Findings	Causes	Signs and Symptoms
Respiratory acidosis	High P_{CO_2} levels	Alveolar hypoventilation (e.g., COPD, head injury, drug overdose, lung disease, pain)	Early signs and symptoms include anxiety, restlessness, dyspnea/cyanosis, disorientation, and headache. Late signs and symptoms include confusion, somnolence, and coma.
Metabolic alkalosis	High HCO_3 levels	<p>Loss of hydrogen ions; vomiting or nasogastric (NG) suction generates metabolic alkalosis by the loss of gastric secretions, which are rich in hydrochloric acid (HCl).</p> <p>Renal losses of hydrogen ions occur whenever the distal delivery of sodium increases in the presence of excess aldosterone (hypokalemia).</p> <p>Alkali administration: Administration of sodium bicarbonate in amounts that exceed the capacity of the kidneys to excrete this excess bicarbonate may cause metabolic alkalosis.</p> <p>Contraction alkalosis: Loss of bicarbonate-poor, chloride-rich extracellular fluid, as observed with thiazide diuretic or loop diuretic therapy or chloride diarrhea concentration.</p>	Vague symptoms of weakness, irritability, and mental changes.

TABLE**1-13 Acid-Base Disorders (continued)**

Type	Findings	Causes	Signs and Symptoms
Respiratory alkalosis	Low P_{CO_2} levels	Alveolar hyperventilation: Central nervous system disorder (pain, anxiety, fear, cerebrovascular accident, meningitis). Hypoxemia (e.g., high altitudes, severe anemia), mechanical ventilation.	Tachypnea, numbness and tingling, blurred vision, diaphoresis, dizziness, arrhythmia syncope, and early tetany.
Metabolic acidosis	Low HCO_3^- levels	Inability to excrete the dietary H^+ load (chronic renal disease, hypoaldosteronism); ketoacidosis (diabetes, alcoholism, and starvation). Lactic acidosis (circulatory failure, drugs and toxins, and hereditary causes). GI HCO_3^- loss (diarrhea).	An increase in alveolar ventilation (Kussmaul's breathing), which results in a compensatory respiratory alkalosis. In addition, nausea and vomiting, cardiac dysrhythmias, lethargy, and coma can occur.

Data from Dutton M: McGraw-Hill's National Physical therapy Examination (ed 1). New York, McGraw-Hill, 2009

TABLE**1-14 Signs and Symptoms of Electrolyte Disturbances**

Disturbance	Definition and Possible Causes	Signs and Symptoms
Hyperkalemia	High blood level of potassium. Possible causes include kidney failure, Addison disease, muscle trauma, and high-potassium diet.	Muscle weakness and/or flaccid paralysis Diarrhea and/or abdominal cramps Bradycardia and/or arrhythmia
Hypokalemia	Low blood level of potassium. Possible causes include decreased food intake/poor nutrition, Cushing disease, kidney disease, and diuretic medications.	Muscle fatigue and/or cramp Diarrhea and/or vomiting Dizziness and/or arrhythmia Irritability and/or confusion Slow reflex and/or orthostatic hypotension
Hypernatremia	High blood level of sodium. Possible causes include kidney disease, dehydration, decreased fluid intake, Cushing disease, and salt water ingestion.	Restlessness and/or convulsions Tachycardia and/or agitation Weight gain and/or pitting edema Pulmonary edema and/or hypertension
Hyponatremia	Low blood level of sodium. Possible causes include excessive fluid loss and Addison disease.	Muscle weakness and/or muscle twitching Hypotension and/or tachycardia Restlessness and/or convulsions Anxiety and/or headache
Hypercalcemia	High blood level of calcium. Possible causes include bone atrophy, bone cancer, and hyperparathyroidism.	Generalized weakness and/or decreased muscle tone Hypertension and/or cardiac arrest Drowsiness and/or lethargy Weight loss and/or anorexia
Hypocalcemia	Low blood levels of calcium. Possible causes include renal disease/failure, decreased gastrointestinal absorption of calcium, decreased vitamin D.	Muscle cramps and spasms Arrhythmia Convulsions and/or hypotension Numbness and tingling

**TABLE
1-15****Laboratory Values**

Test	Related Physiology	Reference Range Example
Arterial PO ₂	Reflects the dissolved oxygen level based on the pressure it exerts on the bloodstream.	80–100 mm Hg
Arterial P _{CO₂}	Reflect the dissolved carbon dioxide level based on the pressure it exerts on the bloodstream.	36–44 mm Hg
Arterial pH	Reflects the free hydrogen ion concentration; collectively, this test and the arterial PO ₂ and arterial PCO ₂ tests help reveal the acid-base status and how well oxygen is being delivered to the body.	7.35–7.45
Oxygen saturation	Usually a bedside technique (pulse oximetry) to indicate the level of oxygen transport.	95%–100%
Creatine phosphokinase (CPK)	An enzyme found predominantly in the heart, brain, and skeletal muscle. Aids in protein catabolism. Can be separated into subunits or isoenzymes, each derived from a specific tissue. CPK-BB = brain CPK-MB = cardiac CPK-MM = skeletal muscle	Total CPK: Less than 30
Lactate dehydrogenase (LDH)	Present in all body tissues and abundant in red blood cells. Acts as a marker for hemolysis. Isoenzymes are LDH 1–5.	105–333 IU/L (international units per liter)
Alkaline phosphate	An enzyme most active at pH 9.1. Associated with bone metabolism/calcification and lipid transport.	Adults: 13–39 IU/L Infants–Adolescents: Up to 104 IU/L
Sodium (Na)	Major extracellular cation; serves to regulate serum osmolality, fluid, and acid-base balance; maintains transmembrane electric potential for neuromuscular functioning.	136–145 mmol/L
Potassium (K)	Major intracellular cation; maintains normal hydration and osmotic pressure.	3.5–5.5 mmol/L
Chloride (Cl)	Extracellular anion; maintains electrical neutrality of extracellular fluid.	96–106 mmol/L
Carbon dioxide	Reflects body's ability to control pH; important in bicarbonate–carbonic acid blood buffer system.	24–30 mmol/L
Anion gap (sodium minus the sum of chloride and carbon dioxide)	Calculated value helpful in evaluating metabolic acidosis.	3–11 mmol/L
Calcium (Ca)	Transmission of nerve impulses, muscle contractility; cofactor in enzyme reactions and blood coagulation.	8.5–10.8 mg/dL; inversely related to phosphorus level
Phosphorous (PO ₄)	Integral to structure of nucleic acids, in adenosine triphosphate energy transferred, and in phospholipid function. Phosphate helps to regulate calcium levels, metabolism, base balance, and bone metabolism.	2.6–4.5 mg/dL; inversely related to calcium level
Blood urea nitrogen (BUN); measures renal function and protein intake	Amino acid metabolism in the liver produces urea as waste; urea is filtered by the kidney with the portion passively reabsorbed being measured in the plasma.	Adult range: 8–22 mg/dL
Creatinine (a measure of renal function)	Muscle creatine degradation produces creatinine, which in turn is excreted by the kidneys.	Adult range: 0.7–1.4 mg/dL
BUN/creatinine ratio	Assessment of kidney and liver function.	Adult range: 6–25 mg/dL

**TABLE
1-15****Laboratory Values (continued)**

Test	Related Physiology	Reference Range Example
Alanine aminotransferase (ALT)	Enzyme released in cytolysis and necrosis of liver cells.	1–21 units/L
Aspartate aminotransferase (AST)	Enzyme released in cytolysis and necrosis of liver cells; also in heart and skeletal muscle tissues.	7–27 units/L
Alkaline phosphatase (ALP)	Enzyme released in cytolysis and necrosis of liver cells; also in bone.	13–39 units/L
γ -Glutamyltransferase	Enzyme released in cytolysis and necrosis of liver cells; also in kidney tissue.	5–38 units/L
Albumin	Index of liver synthetic capacity.	3.5–5.0 g/dL
Bilirubin, total	Bilirubin is the predominant pigment in bile, and the major metabolite of hemoglobin.	0.2–1.0 mg/dL; direct: 0–0.2 mg/dL; indirect: 0.2–1.0 mg/dL
Ammonium	Liver converts ammonia from blood to urea.	12–55 μ mol/L
WBC count (measures mature and immature WBCs in 1 μ L of whole blood—used in conjunction with WBC differential)	Produced in bone marrow; WBCs provide defense against foreign agents/organisms.	4000–10,000 WBCs/ μ L
WBC differential (visual or computer observation and count of different types of WBCs)	Differentiation of white blood cell types by relative percentages. Cell types usually seen (in descending order): neutrophils (PMN), lymphocytes, monocytes, eosinophils, basophils.	All components totaled equal 100%
Segmented neutrophils	Phagocytize.	~37%–77%
Band neutrophils	Phagocytize; less mature neutrophil.	~0%–11%
Lymphocytes	B-cells produce immunoglobulins; T-cells provide regulatory and effector functions in immunity.	~10%–44%
Monocytes	Phagocytize and contribute to cellular and humoral immunity in association with T-lymphocytes.	~2%–10%
Eosinophils	Also function as phagocytes, somewhat less effectively than neutrophils.	~0%–7%
Basophils	Also function as phagocytes; synthesize and store histamine.	~0%–2%
Red blood cell (RBC)/erythrocyte count (measures the number of RBCs in 1 μ L of blood)	Produced in bone marrow, carry oxygen to tissues.	4.2–6.2 \times 10 ⁶ μ L
Hemoglobin	Reflects concentration of hemoglobin in blood.	12–16 g/dL (values of 8–10 g/dL typically result in decreased exercise tolerance, increased fatigue, and tachycardia, condition that may contraindicate aggressive therapeutic measures, including strength and endurance training)
Hematocrit	Measure of the ratio of packed red blood cells to whole blood. By dividing the hematocrit level by 3, one can approximate the hemoglobin level.	36%–54% (approximately 3 times hemoglobin)

(continued)

**TABLE
1-15****Laboratory Values (continued)**

Test	Related Physiology	Reference Range Example
Indices: Mean cell volume (MCV)	Measure of average size of RBCs—the ratio of hematocrit to red blood cell count.	80–100 fl
Indices: Mean cell hemoglobin concentration (MCHC)	Indicates the average concentration of hemoglobin to hematocrit, and manages the percentage of hemoglobin in 100 mL of blood.	32–36 g/dL; cannot exceed 37 g/dL
Indices: Mean cell hemoglobin (MCH)	Indicates average weight of hemoglobin per RBC.	28–32 picograms (pg)
RBC distribution width	Standard deviation of MCV; measure of degree of uniformity in size of RBCs.	11.7%–14.2%
Erythrocyte sedimentation rate (ESR)	Nonspecific indicator of inflammation or tissue damage.	0–20 mm/1 hour
Platelet count	Reflects potential to address injury to vessel walls, thus regulating homeostasis.	140,000–450,000 μ L

Data from Wall LJ: Laboratory tests and values, in Boissonnault WG (ed): Primary Care for the Physical Therapist: Examination and Triage. St. Louis, Elsevier Saunders, 2005, pp 348–367; and Lotspeich-Steinger CA, Stiene-Martin AE, Koepke JA: Clinical hematology; principles, procedures, correlations. Philadelphia, J. B. Lippincott, 1992

Pharmacology

A drug is any substance that can be used to modify a chemical process or processes in the body—for example, to treat an illness, relieve a symptom, enhance a performance or ability, or alter states of mind. Drug therapy (see Chapter 15) is one of the mainstays of modern treatments, and PTAs often encounter patients who are taking various medications.

Abbreviations

Medical abbreviations are used throughout the various disciplines in health care to document client status or progression. It is important to remember that before using abbreviations The PTA must ensure that they are approved for use by the facility to avoid miscommunication. **Table 1-16** outlines some of the more common abbreviations used by physical therapy professionals.

Imaging Studies

For healthcare professionals involved in the primary management of neuromusculoskeletal disorders, diagnostic imaging is an essential tool. The availability of

diagnostic images varies greatly depending on the practice setting. Although the interpretation of diagnostic images is always the responsibility of the radiologist, it is important for the clinician to know what importance to attach to these reports, and the strengths and weaknesses of the various techniques that image bone and soft tissues, such as muscle, fat, tendon, cartilage, and ligament. In general, imaging tests have a high sensitivity (few false negatives) but low specificity (high false-positive rate), so they are not used in isolation.

Conventional (Plain Film) Radiography

Tissues of greater density allow less penetration of the x-rays and therefore appear lighter on the film. The following structures are listed in order of descending density: metal, bone, soft tissue, water or body fluid, fat, and air. Because air is the least dense material in the body, it absorbs the least amount of x-ray particles, resulting in the darkest portion of the film. In contrast, bone absorbs the greatest amount and therefore appears white. When studying radiographs, a systematic approach such as the mnemonic ABCS is recommended:²⁹

- **A: Architecture or alignment.** The entire radiograph is scanned from top to bottom, side to side, and in each corner to check for the normal shape and alignment of each bone. The outline of each bone should be smooth and continuous.

**TABLE
1-16****Commonly Used Abbreviations**

AAROM	Active assistive range of motion	ER	External rotation or emergency room
abd	Abduction	E-stim	Electrical stimulation
ACL	Anterior cruciate ligament	ex	Exercise
add	Adduction	ext	Extension
ADL	Activities of daily living	FES	Functional electrical stimulation
Ad lib.	As desired	Flex	Flexion
AE	Above elbow	FWB	Full weight-bearing
AFO	Ankle foot orthosis	Fx	Fracture
AK	Above knee	HEP	Home exercise program
amb	Ambulation	HNP	Herniated nucleus pulposus
ANS	Autonomic nervous system	HP	Hot pack
A-P	Anterior–posterior	HR	Heart rate or hold-relax
AROM	Active range of motion	Hx	History
ASIS	Anterior superior iliac spine	ICU	Intensive care unit
BE	Below elbow	Ind	Independent
bid	Twice a day	IR	Internal rotation
BK	Below knee	JRA	Juvenile rheumatoid arthritis
BP	Blood pressure	Jt	Joint
bpm	Beats per minute	KAFO	Knee–ankle-foot orthosis
CC	Chief complaint	LBP	Low back pain
CGA	Contact guard assist	LCL	Lateral collateral ligament
c/o	Complains of	LE	Lower extremity
CPM	Continuous passive motion	LOB	Loss of balance
CR	Contract–relax	LTG	Long-term goal
CTLSSO	Cervical–thoracic–lumbar–sacral orthosis	MCL	Medial collateral ligament
CTR	Carpal tunnel release	MCP	Metacarpophalangeal
d/c	Discontinued or discharged	MMT	Manual muscle test
DDD	Degenerative disk disease	MVA	Motor vehicle accident
DF	Dorsiflexion	N/A	Not applicable
DIP	Distal interphalangeal	NWB	Nonweight-bearing
DJD	Degenerative joint disease	OOB	Out of bed
DOB	Date of birth	OP	Outpatient
DOE	Dyspnea on exertion	OR	Operating room
DTR	Deep tendon reflexes	ORIF	Open reduction and internal fixation
DVT	Deep vein thrombosis	OT	Occupational therapy
Dx	Diagnosis	PCL	Posterior cruciate ligament
EMG	Electromyography	PF	Plantarflexion

(continued)

TABLE**1-16****Commonly Used Abbreviations (continued)**

PIP	Proximal interphalangeal	TBI	Traumatic brain injury
PMH	Past medical history	TDWB	Touchdown weight-bearing
PNF	Proprioceptive neuromuscular facilitation	TENS	Transcutaneous electrical nerve stimulation
Post op	Postoperative	THA	Total hip arthroplasty
PRE	Progressive resistive exercises	Tid	Three times a day
Prn	As needed	TKA	Total knee arthroplasty
PROM	Passive range of motion	TKE	Terminal knee extension
PWB	Partial weight-bearing	TMJ	Temporomandibular joint
qid	Four times a day	TTWB	Toe touch weight-bearing
RA	Rheumatoid arthritis	Tx	Traction
r/o	Rule out	UE	Upper extremity
ROM	Range of motion	US	Ultrasound
RTC	Rotator cuff	WB	Weight-bearing
Rx	Treatment	WBAT	Weight-bearing as tolerated
SCI	Spinal cord injury	WFL	Within functional limits
SLR	Straight leg raise	WNL	Within normal limits
SOB	Short of breath	y/o	Year(s) old
STG	Short-term goal		

Breaks in continuity usually represent fractures. Malalignments may indicate subluxations or dislocations, or in the case of the spine, scoliosis. Malalignment in a trauma setting must be considered traumatic rather than degenerative until proven otherwise.³⁰

- **B: Bone density.** The clinician should assess both general bone density and local bone density. The cortex of the bone should appear denser than the remainder of the bone. Subchondral bone becomes sclerosed in the presence of stress in accordance with Wolff's law³¹ and increases its density. This is a radiographic hallmark of osteoarthritis.
- **C: Cartilage spaces.** Each joint should have a well-preserved joint space between the articulating surfaces. A decreased joint space typically indicates that the articular cartilage is thinned from a degenerative process such as osteoarthritis.
- **S: Soft tissue evaluation.** Trauma to soft tissues produces abnormal images resulting from effusion, bleeding, and distension.

Arthrography

Arthrography is the study of structures within an encapsulated joint using a contrast medium with or without air that is injected into the joint space. The contrast medium distends the joint capsule. This type of radiograph is called an *arthrogram*. An arthrogram outlines the soft tissue structures of a joint that would not be visible with a plain-film radiograph. This procedure is commonly performed on patients with injuries involving the shoulder or the knee.

Myelography

Myelography is the radiographic study of the spinal cord, nerve roots, dura mater, and spinal canal. The contrast medium is injected into the subarachnoid space, and a radiograph is taken. This type of radiograph is called a *myelogram*. Myelography is used frequently to diagnose intervertebral disk herniations, spinal cord compression, stenosis, nerve root injury, or tumors. The nerve root and its sleeve can be observed clearly on direct myelograms.

Discography

Discography is the radiographic study of the intervertebral disc. A radiopaque dye is injected into the disc space between two vertebrae. A radiograph is then taken. This type of radiograph is called a *discogram*. An abnormal dye pattern between the intervertebral discs indicates a rupture of the disc.

Angiography

Angiography is the radiographic study of the vascular system. A water-soluble radiopaque dye is injected either intra-arterially (arteriogram) or intravenously (venogram). A rapid series of radiographs is then taken to follow the course of the contrast medium as it travels through the blood vessels. Angiography is used to help detect injury to or partial blockage of blood vessels.

Computed Tomography

A computed tomography (CT) scanner system, also known as computerized axial tomography (CAT) and computerized transaxial tomography (CTI), consists of a scanning gantry that holds the x-ray tube and detectors (moving parts), a moving table or couch for the patient, an x-ray generator, computer processing unit, and a display console or workstation.³² Images are obtained in the transverse (axial) plane of the patient's body by rotating the x-ray tube 360 degrees. The x-rays are absorbed in part by the patient's body. The amount of x-rays transmitted through the body is detected in the opposite side of the gantry by an array of detectors. Image quality in CT imaging depends on a variety of factors that are mostly selected by the operator. Two parameters are used to define the image quality of a given system:³²

- **Spatial resolution:** Spatial resolution is defined as the ability of the system to distinguish between two closely spaced objects. For improvement of spatial resolution, the operator selects a small matrix size (256 × 256), small field of view, and thin slices. Special reconstruction algorithms can also be chosen to improve spatial resolutions.
- **Contrast resolution:** Contrast resolution is defined as the ability of the system to discriminate between two adjacent areas with different attenuation values. The contrast resolution of CT is dramatically better than conventional radiography (approximately 100 times), and the images provide greater soft tissue detail than do plain films.³⁰

As with plain radiographs, air appears as the darkest portion of the film, and bone appears white.

CT Myelogram

A CT myelogram (CTM) is a diagnostic tool that uses radiographic contrast media (dye) that is injected into the subarachnoid space (cerebrospinal fluid; CSF). After the dye is injected, the contrast medium serves to illuminate the spinal canal, cord, and nerve roots during imaging. The low viscosity of the water-soluble contrast permits filling of the nerve roots and better visualization.³⁰

Magnetic Resonance Imaging

Unlike CT, which depends upon multiple thin slices of radiation that are “backplotted” through Fourier transformers, magnetic resonance imaging (MRI) is the result of the interaction between magnetic fields, radiofrequency (RF) waves, and complex image reconstruction techniques. Normally, the axes of protons in the body have a random orientation. However, if the body or body part is placed within a high magnetic field, the protons align themselves parallel with or perpendicular to the direction of the magnetic field. The protons, now spinning synchronously at an angle within the magnetic field, induce a current in a nearby transmitter–receiver coil or antenna. This small nuclear signal is then recorded, amplified, measured, and localized (linked to the exact location in the body where the MRI signal is coming from), producing a high-contrast, clinically useful MR image.

Radionuclide Scanning

Radionuclide scanning involves the introduction of bone-seeking isotopes that are administered to the patient orally or intravenously and allowed to localize to the skeleton. The photon energy emitted by the isotopes is then recorded using a gamma camera 2 to 4 hours later. The pathophysiologic basis of the technique is complex but depends on localized differences in blood flow, capillary permeability, and metabolic activity that accompany any injury, infection, repair process, or growth of bone tissue.³³ The most common radionuclide scanning test is the bone scan. This test is used to detect particular areas of abnormal metabolic activity within a bone. The abnormality shows up as a so-called hot spot that is darker in appearance than normal tissue.

REVIEW Questions

1. What was/were developed to “encourage a uniform approach to physical therapist practice and to explain to the world the nature of that practice”?
 - a. State licensure laws
 - b. *The Guide to Physical Therapist Practice*
 - c. The National Physical Therapy Examination
 - d. The Medicare Act of 1973
2. True or false: Physical therapists are the only professionals who provide physical therapy.
3. What is the function of the Commission on Accreditation in Physical Therapy Education (CAPTE)?
 - a. To design policies and procedures with regard to physical therapy
 - b. To make autonomous decisions concerning the accreditation status of continuing education programs for the physical therapists and physical therapist assistants
 - c. To design questions for the National Physical Therapy Examination
 - d. To oversee state licensing laws
4. The purpose of clinical education is to provide student clinicians with opportunities to:
 - a. Observe and work with a variety of patients under professional supervision and in diverse professional settings and to integrate knowledge and skills at progressively higher levels of performance and responsibility
 - b. Provide a student with the opportunity to take a break from school work
 - c. Develop clinical reasoning skills and management skills, as well as to master techniques that develop competence at the level of a beginning practitioner
 - d. a and c.
5. A loss or abnormality of anatomic, physiologic, or psychologic structure or function in a description of which category of the disablement model?
 - a. Impairment
 - b. Functional limitation
 - c. Disability
 - d. None of the above
6. Which element of the patient/client management includes gathering information from the chart, other caregivers, the patient, the patient’s family, caretakers, and friends in order to identify and define the patient’s problem(s)?
 - a. Evaluation
 - b. Intervention
 - c. Examination
 - d. Tests and measures
7. What is the purpose of the re-examination?
 - a. To allow the clinician to evaluate progress and modify interventions as appropriate
 - b. To provide the insurance companies with justification for payment
 - c. All of the above
 - d. None of the above
8. Which component of the examination includes an analysis of posture, structural alignment or deformity, scars, crepitus, color changes, swelling, muscle atrophy, and the presence of any asymmetry?
 - a. Palpation
 - b. Observation
 - c. Patient history
 - d. None of the above
9. What are anthropometrics?
 - a. Measurable physiological characteristics, including height and weight
 - b. Studies involving the history of man
 - c. A form of laboratory test
 - d. None of the above
10. Which of the elements of patient/client management attempts to identify a relationship between the symptoms reported and the signs of disturbed function?
 - a. Test and measures
 - b. Patient history
 - c. Examination
 - d. None of the above
11. Which of the elements of patient/client management determines the predicted level of function that the patient will attain and an identification of the barriers that may impact the achievement of optimal improvement (age, medication(s), socioeconomic status, comorbidities, cognitive status, nutrition, social support, and environment) within a certain time frame?
 - a. Evaluation
 - b. Examination
 - c. Prognosis
 - d. Diagnosis

12. Which of the following statements is/are true about the plan of care?
- It is based on the examination, evaluation, diagnosis, and prognosis, including the predicted level of optimal improvement.
 - It describes the specific interventions to be used, and the proposed frequency and duration of the interventions that are required to reach the anticipated goals and expected outcomes.
 - It includes plans for discharge of the patient/client taking into consideration achievement of anticipated goals and expected outcomes, and provides for appropriate follow-up or referral.
 - All of the above
13. Which of the elements of patient/client management can be defined as “the purposeful and skilled interaction of the clinician and the patient/client and, when appropriate, with other individuals involved in the patient/client care, using various physical therapy procedures and techniques to produce changes in the condition consistent with the diagnosis and prognosis”?
- Examination
 - Prognosis
 - Intervention
 - Evaluation
14. What is the major difference between a client and a patient?
15. What are the four components of the traditional SOAP note?
16. True or false: Correction fluid/tape can be used to correct text in the medical records.
17. Which of the following patient attributes would not impact the clinician’s choice of an intervention?
- Comorbidities
 - Physiological impairments
 - Anatomic impairments
 - Race
18. In a typical physical therapy department, which staff member ensures that the objectives of the service are efficiently and effectively achieved within the framework of the stated purpose of the organization?
- Staff physical therapist
 - Physical therapy director
 - Department secretary
 - None of the above
19. True or false: A PTA may modify an intervention only in accordance with changes in patient status and within the established plan of care developed by the physical therapist.
20. The following are all job responsibilities of the PT volunteer, except:
- Taking phone messages
 - Cleaning the whirlpool
 - Performing secretarial functions
 - All of the above are job responsibilities of the PT volunteer
21. Which of the following is/are included in the APTA Code of Ethics?
- A physical therapist shall exercise sound professional judgment
 - A physical therapist shall achieve and maintain professional competence
 - A physical therapist shall respect the rights and dignity of all individuals and shall provide compassionate care
 - a and c
 - All of the above
22. You are a PTA assigned a PTA student who is performing his first clinical internship. Which of the following would be the most appropriate goals for this physical therapy student?
- To be able to perform an orthopedic examination on all patients
 - To perform all aspects of treatment using correct body mechanics
 - To correctly reassess all patient problems
 - To perform all patient care duties assigned
23. Which of the following duties cannot be performed legally by a PTA?
- Call a physician about a patient’s status
 - Add 3 pounds to a patient’s current exercise protocol
 - Allow a patient to increase in frequency from 2 times/week to 3 times/week
 - Perform ultrasound on a patient
24. CORF is an abbreviation for which of the following?
- Certified Owner of a Rehabilitation Facility
 - Certified Outpatient Rehabilitation Facility
 - Control Organization for Rehabilitation Facilities
 - None of the above
25. A PTA is performing a chart review and discovers that lab results reveal that the patient has malignant cancer. When treating the patient, the PTA is asked by the patient, “Did my lab results come back?” The appropriate response for the PTA is:

- a. To inform the patient about the results and contact the social worker to assist in consultation of the family
 - b. To inform the patient that it would be inappropriate for him or her to comment on the lab results before the physician has assessed the lab results and spoken to the patient
 - c. To inform the patient that he or she has a malignant cancer
 - d. To tell the patient the results are in, but that physical therapists are not allowed to comment on the results
- 26.** A PTA is instructing a PTA student in documentation using a SOAP note. Where should the following phrase be placed in a SOAP note: “The patient reports wanting to return to playing soccer in 5 weeks”?
- a. Subjective
 - b. Objective
 - c. Assessment
 - d. Plan
- 27.** True or false: The PTA is frequently called upon to modify or adjust therapeutic interventions in consultation with the supervising physical therapist, based on a variety of physiologic responses from the patient. These responses include, but are not limited to, changes in a patient’s signs and symptoms, range of motion (ROM), strength, endurance, function, balance, and coordination.

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