

# ***Exam Blueprint and Specialty Competencies***

## **Introduction – Blueprint for the Orthopaedic Nursing Certification Exam**

The primary function of the blueprint for the CNA Orthopaedic Nursing Certification Exam is to describe how the exam is to be developed. Specifically, this blueprint provides explicit instructions and guidelines on how the competencies are to be expressed within the exam in order for accurate decisions to be made on the candidates' competence in orthopaedic nursing.

The blueprint has two major components: (1) the content area to be measured and (2) the explicit guidelines on how this content is to be measured. The content area consists of the list of competencies (i.e., the competencies expected of fully competent practising orthopaedic nurses with at least two years of experience), and the guidelines are expressed as structural and contextual variables. The blueprint also includes a summary chart that summarizes the exam guidelines.

### **Description of Domain**

The CNA Orthopaedic Nursing Certification Exam is a criterion-referenced exam.<sup>1</sup> A fundamental component of a criterion-referenced approach to testing is the comprehensive description of the content area being measured. In the case of the Orthopaedic Nursing Certification Exam, the content consists of the competencies of a fully competent practising orthopaedic nurse with at least two years of experience.

This section describes the competencies, how they have been grouped and how they are to be sampled for creating an exam.

### **Developing the List of Competencies**

Orthopaedic nurses from various regions in Canada participated in the development of the set of competencies. A working group consisting of highly experienced orthopaedic nurses developed a preliminary set of competencies during a five-day meeting. The competencies were then reviewed by two working groups of 6 to 8 highly experienced orthopaedic nurses, during two one-day working sessions. The final list of competencies was approved by the Orthopaedic Nursing Certification Exam Committee.

<sup>1</sup> Criterion-referenced exam: An exam that measures a candidate's command of a specified content or skills domain or list of instructional objectives. Scores are interpreted in comparison to a predetermined performance standard or as a mastery of defined domain (e.g., percentage correct and mastery scores), independently of the results obtained by other candidates. (Brown, 1983).

### **Assumptions**

The goal of orthopaedic nursing is to assist the client to attain and to maintain optimum health, as it is defined by the client. In developing the list of competencies for orthopaedic nurses, the following assumptions were made:

### **Health and Well-being of Clients**

- Orthopaedic nurses define health broadly, recognizing that it is influenced by social, economic, political, developmental, psychological, physical, biological and cultural factors.
- Orthopaedic nurses respect the clients' perception of health and acknowledge that clients are accountable for their own health.
- Individuals influence their own health and may direct their behaviours toward the achievement of their own health potential through preventive and promotive activities, maintenance efforts and rehabilitation efforts.
- The health and well-being of orthopaedic clients may change throughout the continuum of care and may result in permanent changes or a chronic condition.
- The health and well-being of orthopaedic clients may vary over time, resulting in transient or permanent changes or a chronic condition.

### **Client**

- Orthopaedic clients include individuals, family, groups and communities.
- Orthopaedic nurses acknowledge that clients have the right to autonomy, respect, privacy, dignity, confidentiality, informed consent and access to information.
- Orthopaedic nurses respect and strive to protect, maintain and advocate for the rights of an individual in their care.

### **Family**

- The family is defined by the client.
- The client's ability to cope with the orthopaedic illness is significantly influenced by access to family support and by family members' behavioural responses to the illness.

### **Environment**

- Orthopaedic nurses practise in a variety of capacities and settings including the home, the community and health-care institutions (primary to tertiary, ambulatory, rehabilitation and long-term care).
- Orthopaedic nurses believe that environment has a major impact on health and on care delivery and that nurses can actively participate in enhancing practice environments.
- Orthopaedic nurses value environments that:
  - support the best possible client outcomes;
  - support safe, competent and cost-effective ethical care;
  - involve and value nursing in decision-making;
  - enhance professional nursing practice and quality of work life;
  - support and facilitate continuing professional education and personal development; and
  - recognize orthopaedic nursing as a specialty nursing practice.

### **Orthopaedic Nursing Process**

- The orthopaedic nursing assessment is continuous, comprehensive and holistic and maximizes appropriate use of available resources.
- Orthopaedic nurses act in a manner consistent with their professional responsibilities, beliefs, values and standards of practice.
- Orthopaedic nurses are accountable to their clients, their employers and their profession in accordance with the requirements of their provincial and territorial regulatory bodies.
- Orthopaedic nurses believe that nursing practice should be evidence-based and that competency should be maintained through a professional, evaluative and reflective process.

### **Learning**

- Orthopaedic nurses have and use unique knowledge to provide holistic care to their clients.
- Orthopaedic nurses are committed to lifelong learning.
- Orthopaedic nurses recognize their responsibility to share knowledge and skills in order for their clients to achieve their potential.

### **Nurse**

- The orthopaedic nurse uses a unique body of knowledge to provide care to individuals of all ages with musculoskeletal disorders.
- The orthopaedic nurse plans care based on identified actual or potential problems, implements nursing interventions and evaluates the client's responses.
- The orthopaedic nurse documents assessment data, the plan for care, interventions and client outcomes.
- The orthopaedic nurse uses best practice guidelines and research to plan and provide client care.
- The orthopaedic nurse respects the uniqueness of each individual client and family.
- The orthopaedic nurse develops a therapeutic relationship with the client and family.
- The orthopaedic nurse acts as an advocate for the client and family.
- The orthopaedic nurse supports the active participation of the client and family in all aspects of care.
- The orthopaedic nurse works collaboratively within an interdisciplinary team structure, interacting with multiple health-care disciplines.
- The orthopaedic nurse works within the context of a health-care continuum.
- The orthopaedic nurse pursues professional growth and development and maintains competence.
- The orthopaedic nurse uses reflective practice to identify and address personal learning needs.
- Orthopaedic nursing practice promotes health and wellness as well as the prevention of injury and illness.
- The orthopaedic nurse supports clients in their rehabilitation.

### **Competency Categories**

The competencies are classified under the seven-category scheme commonly used to organize orthopaedic nursing. Some of the competencies lend themselves to one or more of the categories; therefore, these seven categories should be viewed simply as an organizing framework. Also, it should be recognized that the competency statements vary in scope, with some representing global behaviours and others representing more discrete and specific nursing behaviours.

**Percentage of Competencies in Each Group**

The following table presents the number and the percentage of competencies in each category.

**Table 1: Percentage of Competencies in Each Group**

Category	Number of competencies	Percentage of the total number of competencies
Optimizing Musculoskeletal Function	12	5%
Optimizing Cognitive Function	12	5%
Optimizing Mental Health	9	4%
Minimizing Actual and Potential Complications	87	34%
Optimizing Pain Management	5	2%
Applying Knowledge of Anatomy and Pathophysiology	44	17%
Applying Knowledge of Surgical Principles and Procedures	87	34%

**Competency Sampling**

Using the grouping and the guideline that the Orthopaedic Nursing Certification Exam will consist of approximately 165 questions; the categories have been given the following weights in the total examination.

**Table 2: Competency Sampling**

Categories	Approximate weights in the total examination
Optimizing Musculoskeletal Function	5-15%
Optimizing Cognitive Function	1-5%
Optimizing Mental Health	1-5%
Minimizing Actual and Potential Complications	25-35%
Optimizing Pain Management	1-5%
Applying Knowledge of Anatomy and Pathophysiology	10-20%
Applying Knowledge of Surgical Principles and Procedures	25-35%

## Technical Specifications

In addition to the specifications related to the competencies, other variables are considered during the development of the Orthopaedic Nursing Certification Exam. This section presents the guidelines for two types of variables: structural and contextual.

**Structural Variables:** Structural variables include those characteristics that determine the general appearance and design of the exam. They define the length of the exam, the format and presentation of the exam questions (e.g., multiple-choice) and special functions of exam questions (e.g., independent questions).

**Contextual Variables:** Contextual variables specify the nursing contexts in which the exam questions will be set (e.g., client culture, client health situation or health-care environment).

### Structural Variables

**Exam Length:** The exam consists of approximately 165 multiple-choice questions.

**Question Presentation:** The multiple-choice questions are presented in one of two formats: case-based or independent. Case-based questions are a set of approximately four questions associated with a brief health-care scenario (i.e., a description of the client's health-care situation). Independent questions stand alone. In the Orthopaedic Nursing Certification Exam, 50 to 60 per cent of the questions are presented as independent questions and 40 to 50 per cent are presented within cases.

**Taxonomy for Questions:** To ensure that competencies are measured at different levels of cognitive ability, each question on the Orthopaedic Nursing Certification Exam is aimed at one of three levels: knowledge/comprehension, application or critical thinking.<sup>2</sup>

#### 1. Knowledge/Comprehension

This level combines the ability to recall previously learned material and to understand its meaning. It includes such mental abilities as knowing and understanding definitions, facts and principles and interpreting data (e.g., knowing the effects of certain drugs or interpreting data appearing on a client's record).

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<sup>2</sup> These levels are adapted from the taxonomy of cognitive abilities developed in Bloom, 1956.

**2. Application**

This level refers to the ability to apply knowledge and learning to new or practical situations. It includes applying rules, methods, principles and theories while providing care to clients (e.g., applying nursing principles to the care of clients).

**3. Critical Thinking**

The third level of the taxonomy deals with higher-level thinking processes. It includes the abilities to judge the relevance of data, to deal with abstraction and to solve problems (e.g., identifying priorities of care or evaluating the effectiveness of interventions). The orthopaedic nurse with at least two years of experience should be able to identify cause-and-effect relationships, distinguish between relevant and irrelevant data, formulate valid conclusions and make judgments about the needs of clients.

The following table presents the distribution of questions for each level of cognitive ability.

**Table 3: Distribution of Questions for Each Level of Cognitive Ability**

Cognitive Ability Level	Percentage of questions on the Orthopaedic Nursing Exam
Knowledge/Comprehension	25-35%
Application	35-45%
Critical Thinking	25-35%

**Contextual Variables**

**Client Age and Gender:** Two of the contextual variables specified for the Orthopaedic Nursing Certification Exam are the age and gender of the clients. Providing specifications for the use of these variables ensures that the clients described in the exam represent the demographic characteristics of the population encountered by orthopaedic nurses. These characteristics, listed in Table 4 as percentage ranges, serve as guidelines for test development.

**Table 4: Specification for Client Age and Gender**

Age Group	Percentage of questions on the Orthopaedic Nursing Exam	
	Male	Female
Birth to 15 years	5-15%	5-15%
16-34 years	20-30%	1-5%
35-64 years	5-15%	5-15%
65+ years	1-5%	20-30%

**Client Culture:** Questions are included that represent awareness, sensitivity and respect for different cultural values, beliefs and practices, without introducing stereotypes.

**Client Health Situation:** In the development of the Orthopaedic Nursing Certification Exam, the client is viewed holistically.

**Health-Care Environment:** It is recognized that orthopaedic nursing is practised in a variety of settings. The health-care environment is specified only where it is required for clarity or in order to provide guidance to the candidate.

### Conclusions

The blueprint for the Orthopaedic Nursing Certification Exam is the product of a collaborative effort between CNA, ASI, CONA and a number of orthopaedic nurses across Canada. Their work has resulted in a compilation of the competencies required of practising orthopaedic nurses and has helped determine how those competencies will be measured on the Orthopaedic Nursing Certification Exam. A summary of these guidelines can be found in the summary chart: Orthopaedic Nursing Certification Development Guidelines.

Orthopaedic nursing practice will continue to evolve. As this occurs, the blueprint may require revision so that it accurately reflects current practices. CNA will ensure that such revision takes place in a timely manner and will communicate any changes in updated editions of this document.

# Summary Chart

## Orthopaedic Nursing Certification Exam Development Guidelines

Structural Variables			
Exam Length and Format	Approximately 165 objective questions (e.g., multiple choice)		
Question Presentation	50-60% independent questions 40-50% case-based questions		
The Cognitive Domain	Knowledge/Comprehension	25-35% of questions	
	Application	35-45% of questions	
	Critical Thinking	25-35% of questions	
Competency Categories	Optimizing Musculoskeletal Function*	5-15% of questions	
	Optimizing Cognitive Function	1-5% of questions	
	Optimizing Mental Health	1-5% of questions	
	Minimizing Actual and Potential Complications	25-35% of questions	
	Optimizing Pain Management*	1-5% of questions	
	Applying Knowledge of Anatomy and Pathophysiology	10-20% of questions	
	Applying Knowledge of Surgical Principles and Procedures	25-35% of questions	
	*Competencies related to pain are also integrated in most of the competency categories.		
Contextual Variables			
Client Age and Gender		Male	Female
	Birth to 15 years	5-15%	5-15%
	16 - 34 years	20-30%	1-5 %
	35 - 64 years	5-15%	5-15%
	65 + years	1-5%	20-30%
Client Health Situation	In the development of the Orthopaedic Nursing Certification Exam, the client is viewed holistically.		
Health-Care Environment	It is recognized that orthopaedic nursing is practised in a variety of settings. The health-care environment is specified only where it is required for clarity or in order to provide guidance to the candidate.		

# ***The Orthopaedic Nursing Certification Exam List of Competencies***

## **Optimizing Musculoskeletal Function**

The orthopaedic nurse:

- 1.1 identifies the effects of mobility on the health and healing of bones and muscles (e.g., muscle strength, bone growth, weight-bearing status).
- 1.2 assesses factors that enhance the client's mobility (e.g., use of assistive devices, prefunctional level, muscle conditioning, home environment, mental attitude, cognitive function, pain management).
- 1.3 assesses factors that impede the client's mobility (e.g., gait, disease entity, altered cognitive status, age, joint mobility, surgical interventions, medications, muscle conditioning, pain, activity level tolerance, multiple fractures, soft tissue injuries).
- 1.4 recognizes the impact of reduced mobility (e.g., life changes, occupation, financial status, activities of daily living, psychosocial condition, physical condition).
- 1.5 selects appropriate nursing interventions to maximize function and prevent complications related to reduced mobility (e.g., assistive devices, nutrition, pain management, deep breathing and coughing, movement, exercise program, skin care).
- 1.6 promotes client safety during transfers, movement and ambulation (e.g., crutches, canes, client helpers, walkers, walking casts, cast boots, transfer and lift devices, appropriate number of staff for transfers and positioning, log rolling technique).
- 1.7 addresses the client's and family's learning needs regarding proper body mechanics, activity, movement and weight-bearing restrictions and use of assistive devices.

## **Positioning**

- 1.8 recognizes deviation from normal body alignment (e.g., external rotation, scoliosis, abduction, dislocation).

## **Physical Condition**

- 1.9 identifies strategies and resources to enhance the physical health of orthopaedic clients through pertinent counselling and education (e.g., smoking cessation, weight reduction, conditioning exercises).

## **Nutrition**

- 1.10 conducts a focused nutritional assessment (e.g., inability to feed self due to fractured wrists, positioning limitations, increased nutritional demand for healing bones).
- 1.11 identifies interventions to promote proper nutrition (e.g., positioning to facilitate eating, food preferences, nutrients that promote bone and tissue healing, dietician consult, antiemetics).
- 1.12 addresses the client's and family's learning needs regarding nutrition.

## **Optimizing Cognitive Function**

The orthopaedic nurse:

### **Dementia**

- 2.1 understands the basic pathophysiology of dementia.
- 2.2 identifies characteristics of dementia (i.e., gradual onset, progressive decline, non-reversible).
- 2.3 implements nursing interventions to manage dementia and reduce stressors (e.g., involve family or caregiver in assessment and care of clients, appropriate referrals, bowel protocol, pain management, appropriate communication techniques).
- 2.4 addresses the client's and family's learning needs regarding dementia.

### **Delirium**

- 2.5 identifies clients at risk for delirium (e.g., pain, prior delirium or dementia, retention, urine infection, respiratory infection, wound infection, sensory impairment, medications, hypoxia, fluid and electrolyte imbalance, altered laboratory values, alcohol consumption, unfamiliar environment, surgery).
- 2.6 identifies the characteristics of delirium (i.e., sudden onset, fluctuating course, potentially reversible, hypoactive and hyperactive behaviours).
- 2.7 identifies prevention strategies to reduce the risk of delirium.
- 2.8 involves the family or caregiver in assessment and care of the client with delirium.
- 2.9 implements nursing interventions to prevent and manage delirium (e.g., medication management, decreased stimuli, continuity of care).

- 2.10 identifies risk of recurrence of delirium.
- 2.11 assesses the client's and family's learning needs regarding delirium.
- 2.12 provides assurance and support to the client and family coping with the client's delirium.

## **Optimizing Mental Health**

The orthopaedic nurse:

### **Depression**

- 3.1 identifies the prevalence of depression.
- 3.2 identifies clients at risk for depression (e.g., prolonged pain, immobility, loss).
- 3.3 identifies signs of depression (e.g., appetite change, anger, sadness, expressions of hopelessness, lack of motivation).
- 3.4 selects interventions to manage the care of the client with depression (e.g., pain control, verbalization and opportunities for social interaction, referrals to psychiatry, geriatrics or social work).
- 3.5 addresses the client's and family's learning needs regarding depression.

### **Substance Abuse**

- 3.6 identifies risk factors for substance withdrawal (e.g., prior alcohol or drug use, volume and frequency of alcohol or drug consumed, elevated blood alcohol level, previous adverse consequence to health, prior alcohol withdrawal).
- 3.7 identifies the characteristics of substance withdrawal (e.g., anxiety, agitation, confusion, tremors, changes in vital signs, vomiting, hallucinations).
- 3.8 identifies strategies to prevent, minimize and manage substance withdrawal (e.g., medications, monitoring lab values and vital signs, safety precautions, offering substance as ordered).
- 3.9 provides information to the client and family about resources available in the community (e.g., AA, support groups, drug addiction programs).

## Minimizing Actual and Potential Complications

The orthopaedic nurse:

### Skin Integrity

#### Pressure Ulcers

- 4.1 identifies risk factors for pressure ulcers (e.g., immobility, location, casts and splints).
- 4.2 selects appropriate interventions to prevent skin breakdown (e.g., nutrition and hydration, bed and seating surfaces, positioning, barrier creams, proper hygiene).
- 4.3 assesses the size, location and stage of pressure ulcers.
- 4.4 selects appropriate interventions to promote pressure ulcer healing.
- 4.5 addresses the client's and family's learning needs about the prevention and management of pressure ulcers.

#### Fracture Blisters

- 4.6 identifies clients at risk for fracture blisters.
- 4.7 implements nursing interventions to manage fracture blisters (e.g., dressings, proper elevation).

### Cardiovascular

#### Orthostatic Hypotension

- 4.8 identifies potentiating factors for the development of orthostatic hypotension (e.g., older adults, immobilized clients, postoperative clients, volume loss, medications).
- 4.9 recognizes the manifestations of orthostatic hypotension.
- 4.10 selects interventions to safely address orthostatic hypotension.
- 4.11 addresses the client's and family's learning needs regarding strategies to accommodate orthostatic hypotension.

**Deep Vein Thrombosis (DVT)**

- 4.12 identifies risks factors for the development of DVT (e.g., obesity, pre-existing cardiovascular disease, lower limb surgery, immobilization, Virchow's triad).
- 4.13 recognizes the manifestations of DVT (e.g., pain in the calf, excessive swelling not relieved with elevation).
- 4.14 implements interventions to prevent DVT formation (e.g., mobility, stockings, anticoagulation, calf compression devices).
- 4.15 understands the pharmacologic characteristics and principles of anticoagulants.
- 4.16 monitors the response of the client to anticoagulation therapy (e.g., observing for bleeding, analysing blood values).
- 4.17 addresses the client's and family's learning needs regarding the prevention, identification and treatment of DVT (e.g., risk of recurrence and management of long-term sequelae of DVT).

**Peripheral Edema**

- 4.18 identifies clients at risk for peripheral edema (e.g., decreased venous return, congestive heart failure, low serum albumin, immobilization).
- 4.19 assesses the client for peripheral edema.
- 4.20 selects interventions to prevent and safely manage peripheral edema.
- 4.21 addresses the client's and family's learning needs regarding the prevention and management of peripheral edema.

**Blood Loss, Hemorrhage and Hypovolemic Shock**

- 4.22 identifies clients at risk for blood loss, hemorrhage and hypovolemic shock.
- 4.23 differentiates between the manifestations of blood loss, hemorrhage and hypovolemic shock.
- 4.24 implements interventions for the treatment of blood loss, hemorrhage and hypovolemic shock.

## **Respiratory**

### **Embolism**

- 4.25 understands the differences in the risk factors for development of pulmonary embolism and fat embolism.
- 4.26 differentiates between pulmonary embolism and fat embolism syndrome (e.g., time of onset, petechial rash, laboratory values).
- 4.27 implements nursing interventions to minimize the consequences of pulmonary embolism and fat embolism (e.g., administering oxygen, monitoring vital signs, dealing with anxiety, managing pain, notifying physician, preparing for diagnostics and procedures).

### **Respiratory Infections**

- 4.28 identifies the risk factors for respiratory infections (e.g., post-anesthesia, immobility, chest trauma, past history, comorbid conditions, aging, aspiration).
- 4.29 assesses the client for manifestations of respiratory infections (e.g., fever, productive cough, chest pain, decreased air entry, confusion, adventitious breath sounds, decreased saturation).
- 4.30 implements nursing interventions to prevent and manage respiratory infections (e.g., mobilization, deep breathing and coughing, spirometer, hydration).
- 4.31 addresses the client's and family's learning needs for the prevention and management of respiratory infections.

## **Gastrointestinal**

### **Constipation**

- 4.32 identifies the risk factors for constipation (e.g., immobility, older adult, opioids, history of constipation).
- 4.33 implements appropriate nursing interventions to prevent and manage constipation.
- 4.34 addresses the client's and family's learning needs regarding the prevention and management of constipation.

### **Nausea and Vomiting**

- 4.35 identifies clients at risk for nausea and vomiting (postoperative, use of medications, pseudoparalytic ileus).
- 4.36 selects the interventions to prevent and manage nausea and vomiting and potential resulting complications (e.g., aspiration).

### ***Clostridium difficile* (C. difficile)**

- 4.37 identifies clients at risk for *C. difficile* infections (e.g., use of antibiotics, proximity to other affected clients, immunocompromised, previous *C. difficile* infection).
- 4.38 assesses manifestations of a *C. difficile* infection (e.g., frequent watery stools, foul odour).
- 4.39 selects appropriate interventions to prevent and manage *C. difficile* infections (e.g., isolation, cohorting, avoiding anti-spasmodic and opioid medications, lactose-free and low-fibre diet, increasing fluids, stool specimen for lab confirmation, proper handwashing and room cleaning procedures, yogourt).
- 4.40 addresses the client's and family's learning needs regarding the transmission and treatment of *C. difficile*.

### **Urinary**

#### **Urinary Retention**

- 4.41 identifies the risk factors for urinary retention (e.g., supine position, immobilization, anesthetics and analgesics, age, benign prostatic hypertrophy).
- 4.42 assesses the client for manifestations of urinary retention (e.g., increased blood pressure, decreased output, laboratory values, distended abdomen, frequent urination).
- 4.43 implements appropriate nursing interventions to manage and prevent further urinary retention (e.g., bladder scanner, catheterization, toileting scheduling, administering medications).
- 4.44 addresses the client's and family's learning needs regarding urinary retention.

### **Urinary Tract Infection (UTI)**

- 4.45 identifies clients at risk for UTI (e.g., presence of urinary catheter, bedrest, poor hydration, incomplete bladder emptying).
- 4.46 assesses manifestations of UTI (e.g., fever, burning on micturition, foul odour, increased confusion in the elderly, cloudy urine, leukocytes or nitrates in urinalysis, frequency).
- 4.47 prevents development of UTI (e.g., removal of catheter as soon as no longer required, perineal hygiene, hydration, promotes complete bladder emptying).
- 4.48 selects appropriate interventions to manage UTI (e.g., encourages fluids, encourages optimal bladder emptying, promotes regular toileting in upright sitting position).
- 4.49 addresses the client's and family's learning needs regarding the prevention and management of UTI.

### **Fluid and Electrolyte Imbalance**

- 4.50 identifies clients at risk for developing fluid and electrolyte imbalance (e.g., client with fractured hip waiting for surgery, client with underlying medical condition, medications such as diuretics and ace inhibitors, diarrhea, fluid loss or overload, head injury).
- 4.51 assesses manifestations of fluid and electrolyte imbalance.
- 4.52 implements appropriate nursing interventions to correct fluid and electrolyte imbalance.

### **Musculoskeletal**

#### **Overuse Injuries**

- 4.53 identifies the complications associated with overuse of joints (e.g., carpal tunnel, impingement syndromes, sprains, strains).
- 4.54 implements appropriate non-surgical nursing interventions to prevent and manage overuse of joints (e.g., proper use of splints, positioning).

**Delayed Union and Non-union of Fractures**

- 4.55 identifies the factors that influence bone healing in delayed union and non-union of fractures (e.g., infection, type of fracture, bone, malnutrition, lifestyle patterns, metabolic bone disease, tumour).

**Soft Tissue Injuries**

- 4.56 identifies the acute complications associated with soft tissues injuries (e.g., infection, pain, muscle loss, compartment syndrome, rhabdomyolysis).
- 4.57 identifies the long-term possible consequences of a soft tissue injury (e.g., joint laxity, muscle wasting, chronic pain, disfigurement, dysfunction).
- 4.58 implements appropriate non-surgical nursing interventions to prevent and manage soft tissue injuries (e.g., proper elevation, referral to appropriate health-care provider).
- 4.59 addresses the client's and family's learning needs regarding strategies to prevent soft tissue injuries.

**Muscle Atrophy**

- 4.60 identifies the factors that influence the development of muscle atrophy (e.g., disuse, soft tissue or nerve injury).
- 4.61 implements interventions to promote the building and maintenance of muscles.
- 4.62 addresses the client's and family's learning needs regarding strategies to prevent muscle atrophy.

**Joint Contractures**

- 4.63 identifies clients at risk for contractures.
- 4.64 recognizes the manifestations of contractures.
- 4.65 implements interventions to prevent and manage contractures (e.g., range of motion, splinting).
- 4.66 addresses the client's and family's learning needs regarding prevention and management of contractures.

### **Joint Stiffness**

- 4.67 identifies clients at risk for joint stiffness.
- 4.68 assesses decreased range of motion (e.g., time of onset, associated manifestations).
- 4.69 implements interventions to maintain or increase range of motion (e.g., pain control, icing, regular range-of-motion [ROM] exercises, continuous passive motion machines).
- 4.70 addresses the client's and family's learning needs regarding exercises to maintain or increase range of motion.

### **Joint Instability and Dislocation**

- 4.71 identifies clients at risk for joint instability or dislocation (e.g., joint surgery, trauma).
- 4.72 recognizes the manifestations of joint instability or dislocation (e.g., pain, shortening of limb, ligament laxity, impaired function).
- 4.73 implements appropriate interventions to address joint instability or dislocation (e.g., analgesics, support, brace, physiotherapy, muscle strengthening).
- 4.74 addresses the client's and family's learning needs regarding proper strategies to address joint instability or dislocation (e.g., positioning to prevent dislocation, brace).

### **Neurological**

#### **Neurovascular Compromise**

- 4.75 identifies clients at risk for neurovascular compromise (e.g., fracture of a long bone, tight dressing, cast, braces, traction, mechanism of injury, surgical misadventure).
- 4.76 identifies the manifestations of neurovascular compromise (e.g., pain, pallor, paresthesia, pulselessness, temperature change, decreased motor function, decreased sensory function).
- 4.77 implements interventions to prevent and manage neurovascular compromise (e.g., elevation, support, prevention of contractures).
- 4.78 addresses the client's and family's learning needs regarding management of neurovascular compromise.

### **Compartment Syndrome**

- 4.79 understands the anatomy and pathophysiology associated with compartment syndrome.
- 4.80 recognizes manifestations of compartment syndrome (e.g., pain, pallor, paresthesia, paralysis, pulselessness, pressure).
- 4.81 implements appropriate interventions for preventing or treating compartment syndrome (e.g., loosening restrictive bandages or casts, limb elevation at heart level, hydration, removing ice, contacting physician immediately, muscle pressure monitoring device).
- 4.82 addresses the client's and family's learning needs regarding management of compartment syndrome.

### **Safety**

#### **Fall Risk**

- 4.83 identifies clients at risk for falls in hospital and in the community setting (e.g., previous falls, delirium, medications, urinary difficulties).
- 4.84 implements appropriate fall prevention strategies to reduce the risk for fall in hospital and in the home (e.g., call bell in reach, addressing elimination needs promptly, appropriate use of wheelchairs, bed alarm, walker, cordless phone, handrails on stairs, grab bar in bath, polypharmacy management, increased observation).
- 4.85 addresses the client's and family's learning needs regarding prevention strategies to reduce the risk of falls.

#### **Personal Safety of the Orthopaedic Nurse**

- 4.86 identifies risk factors affecting personal safety and health (e.g., needle stick injury, lifting and moving clients, infection).
- 4.87 implements strategies to prevent personal injury and to protect own health (e.g., handwashing, infection control practices, proper body mechanics, correct use of assistive devices during transfers and client ambulation, appropriate number of staff for lifting procedures and log rolling techniques, stress management strategies).

## Optimizing Pain Management

The orthopaedic nurse:

- 5.1 assesses the client's pain experience, including type and extent of pain, using appropriate tools.
- 5.2 selects interventions for the management of:
  - 5.2a nociceptive pain (e.g., multi-modal pain medication strategies; non-pharmacologic strategies; pre-emptive analgesia; non-analgesic medications; subcutaneous, spinal, epidural or patient-controlled analgesia [PCA]; dermal patches; oral, sublingual, intramuscular, intravenous, intra-articular or regional anesthesia); and
  - 5.2b neuropathic pain (e.g., multi-modal pain medication strategies, non-pharmacologic strategies; pre-emptive analgesia; non-analgesic medications; subcutaneous, spinal, epidural or patient-controlled analgesia; dermal patches; oral, sublingual, intramuscular, intravenous, intra-articular or regional anesthesia).
- 5.3 identifies consequences of unrelieved pain (e.g., increased blood clotting, cardiac stress, depression, immobility).
- 5.4 recognizes atypical presentation and manifestation of pain (e.g., cultural diversity, age, chemical dependency, end-of-life issues, Parkinson's disease, aphasia, comatose condition, dementia, reflex sympathetic dystrophy).

## Applying Knowledge of Anatomy and Pathophysiology

The orthopaedic nurse:

- 6.1 understands bone structure, development and function.
- 6.2 understands joint structure, development and function.
- 6.3 understands muscle, tendon and ligament structure, development and function.
- 6.4 understands neurological system function.
- 6.5 understands the periphero-vascular system.

## **Congenital/Developmental Disorder**

The orthopaedic nurse:

- 6.6 understands the anatomy and pathophysiology associated with the following common orthopaedic congenital disorders: developmental dysplasia of the hip, talipes equinovarus (clubfoot), osteogenesis imperfecta.
- 6.7 implements appropriate nursing interventions to provide care for clients with the following common orthopaedic congenital disorders: developmental dysplasia of the hip (e.g., application and care of abduction devices, mobility restrictions and exercises), talipes equinovarus (clubfoot) (e.g., cast care, application and care of splints, skin integrity), osteogenesis imperfecta (e.g., fracture prevention).
- 6.8 understands the anatomy and pathophysiology associated with the following common developmental disorders: Osgood-Schlatter disease, scoliosis, Legg-Calvé-Perthes disease, slipped capital femoral epiphysis.
- 6.9 implements nursing interventions to provide care for clients with the following common developmental disorders: Osgood-Schlatter disease (e.g., weight-bearing restrictions), scoliosis (e.g., application and care of braces), Legg-Calvé-Perthes disease (e.g., activity level), slipped capital femoral epiphysis (e.g., weight-bearing restrictions, e.g., application and care of braces).
- 6.10 understands the anatomy and pathophysiology associated with the following chronic disorders: muscular dystrophy, cerebral palsy, spina bifida.
- 6.11 implements nursing interventions to provide care for clients with the following chronic disorders: muscular dystrophy, cerebral palsy, spina bifida (e.g., promotion of activity, prevention of complications of immobility).
- 6.12 addresses the client's and family's learning needs related to living with congenital, developmental and chronic disorders.
- 6.13 addresses the impact of the diagnosis of congenital or developmental disorders in family members (e.g., individual and family assessment, information on diagnosis and related issues, appropriate referrals to school and community resources, assistance in reaching maximum independence).

## Degenerative Disorders

The orthopaedic nurse:

- 6.14 understands the anatomy and pathophysiology associated with the following degenerative conditions: chondromalacia patella, lordosis, kyphosis, spondylolisthesis, disc disease.
- 6.15 identifies the factors that are associated with bone and joint degeneration (e.g., steroid use, sport activity, aging, traumas, inflammation, abnormal gait, abnormal positioning, abnormal weight bearing, skeletal deformities, endocrine or hematological disorders, malnutrition).
- 6.16 implements appropriate nursing interventions to provide care for clients with the following degenerative conditions: chondromalacia patella, lordosis, kyphosis, spondylolisthesis (e.g., exercise and bracing).
- 6.17 addresses the client's and family's learning needs related to living with degenerative disorders (e.g., weight reduction, pain management, exercise, access to health and community resources, access to self-help groups).

## Osteoarthritis

- 6.18 understands the anatomy and pathophysiology associated with osteoarthritis (e.g., swollen joints, painful joints, gait changes).
- 6.19 identifies the common causes of osteoarthritis (e.g., previous trauma, steroid use, sports, aging process).
- 6.20 understands the conservative and surgical treatment options (e.g., joint injections, physiotherapy, osteotomy, joint replacement, medication management, NSAIDS, arthrodesis, arthroscopy).
- 6.21 implements appropriate nursing interventions to manage and prevent further joint degeneration for clients with osteoarthritis.

## Metabolic Disorders

The orthopaedic nurse:

- 6.22 understands the anatomy and pathophysiology associated with the following metabolic disorders: osteomalacia, Paget's disease, rickets, hypercalcemia, hypoparathyroidism and hyperparathyroidism, gout.
- 6.23 identifies the risk factors that influence normal bone mineral density (e.g., viral infection, steroids, diet, inactivity, aging, poor nutrition).

- 6.24 implements appropriate nursing interventions to manage care for clients with the following metabolic disorders: osteomalacia, Paget's disease, rickets, hypercalcemia, hypoparathyroidism and hyperparathyroidism (e.g., adequate nutrition, pain management, activity, medication).

### **Osteoporosis**

- 6.25 understands the anatomy and pathophysiology associated with osteoporosis (e.g., hormonal regulation of bone growth and turnover).
- 6.26 understands treatment options for osteoporosis with associated risks (e.g., braces, medications, diet, lifestyle).
- 6.27 identifies the major and minor risk factors for osteoporosis (e.g., family history, gender, previous fractures, history of rheumatoid arthritis, hyperthyroidism, chronic anti-convulsant therapy, low dietary calcium intake, smoking, excessive caffeine intake, medications).
- 6.28 implements appropriate nursing interventions to manage care for clients living with osteoporosis (e.g., prevention of falls).
- 6.29 addresses the client's and family's learning needs related to the progression of the disorder and prevention of fractures (e.g., medication, activity, referral to outside agencies).

### **Inflammatory and Autoimmune Disorder**

The orthopaedic nurse:

- 6.30 understands the anatomy and pathophysiology associated with the following inflammatory and autoimmune disorders: ankylosing spondylitis, psoriatic arthritis, systemic lupus erythematosus, scleroderma.
- 6.31 implements nursing interventions to provide care for clients with the following inflammatory and autoimmune disorders: ankylosing spondylitis, psoriatic arthritis, systemic lupus erythematosus, scleroderma (e.g., exercise, medication).

### **Rheumatoid Arthritis (Juvenile and Adult Onset)**

- 6.32 understands the anatomy and pathophysiology associated with rheumatoid arthritis.
- 6.33 identifies the systemic manifestations of rheumatoid arthritis (e.g., ocular, gastrointestinal, cardiopulmonary and musculoskeletal changes).

- 6.34 understands the principles of pharmacologic treatments for clients with rheumatoid arthritis (e.g., corticosteroids, disease modifiers, anti-inflammatories, analgesics, biologic response modifiers).
- 6.35 implements appropriate nursing interventions to provide care for clients living with rheumatoid arthritis (e.g., lifestyle modifications, assistive devices, pain management, psychosocial support).
- 6.36 addresses the client's and family's learning needs related to rheumatoid arthritis.

## Neoplastic Disorders

The orthopaedic nurse:

- 6.37 understands the anatomy and pathophysiology associated with neoplastic disorders (e.g., common tumour disruptions whether primary or secondary, pathological fractures, spinal tumours, sarcomas, cysts, multiple myeloma).
- 6.38 understands neoplastic treatment options and associated care and resources (e.g., surgery, chemotherapy, radiation, palliation, alternative therapies).
- 6.39 implements appropriate nursing interventions for clients with neoplastic disorders (e.g., pain management, symptom management).
- 6.40 addresses the client's and family's psychosocial and learning needs related to neoplastic disorders

## Infections

The orthopaedic nurse:

- 6.41 understands the anatomy and pathophysiology associated with the following infections: septic joint arthritis, tuberculosis of bone or joints, polio and post-polio disease, osteomyelitis, Lyme disease.
- 6.42 identifies clients at risk for osteomyelitis (e.g., open fractures, internal or external fixation).
- 6.43 implements the appropriate nursing interventions to prevent and manage clients with infections: septic joint arthritis, tuberculosis of bone or joints, polio and post-polio disease, osteomyelitis (e.g., side effect of medication, adherence to medication regime, mobility, wound care, nutrition).
- 6.44 addresses the client's and family's learning needs related to bone and joint infections.

## Applying Knowledge of Surgical Principles and Procedures

The orthopaedic nurse:

- 7.1 understands the goals of orthopaedic surgery (e.g., quality of life, pain management, mobility, life saving, limb salvage, restoration of function, alignment).
- 7.2 recognizes the key elements of the preoperative preparation for orthopaedic surgeries:
  - 7.2a educational preparation (e.g., physical conditioning, smoking cessation, nutrition [e.g., pre-admission anemia screening and treatment], restrictions and precautions, home preparations or environmental modifications, expected postop recovery and expected length of stay in hospital [e.g., pathway], maximizing self-care principles [e.g., promoting independence with activities of daily living]); and
  - 7.2b medical preparation (e.g., blood work, anemia treatment, diagnostics procedures, referral to blood conservation program).
- 7.3 addresses key elements of discharge preparation following orthopaedic surgery or injury (e.g., equipment and resource needs, medication protocols, follow-up care, education regarding potential complications, medication administration, use of equipment, follow-up care).

## Reconstructive Surgery

For primary and revision arthroplasty (hip, knee, shoulder, ankle, elbow, finger), the orthopaedic nurse:

- 7.4 recognizes the underlying conditions that may require arthroplasty surgery (e.g., osteoarthritis, rheumatoid arthritis, avascular necrosis, trauma, failed previous arthroplasty).
- 7.5 prepares the client for arthroplasty surgery (e.g., blood conservation program, client expectations, home preparations, activity).
- 7.6 implements appropriate nursing interventions for postoperative arthroplasty surgery:
  - 7.6a principles of positioning and range of motion (e.g., abduction and flexion restrictions for hip arthroplasty);
  - 7.6b safe use of equipment (e.g., assistive devices, raised toilet seat for hip and knee arthroplasty); and
  - 7.6c prevention and management of potential complications (e.g., dislocations; joint infections; prosthesis, implant or bone graft rejections; blood loss; hematoma).
- 7.7 addresses key elements of discharge preparation following arthroplasty (e.g., physiotherapy, DVT prophylaxis, mobility restrictions, client education, access to health and community resources).

## Spinal Surgery Fusion, Discectomy, Internal Fixation and Surgical Realignment)

The orthopaedic nurse:

- 7.8 recognizes the underlying conditions that may require spinal surgery (e.g., spinal stenosis, spinal tumours, degenerative diseases, spondylolisthesis, scoliosis, trauma).
- 7.9 prepares the client for spinal surgery (e.g., blood conservation program, client expectations, home preparations, activity, baseline spinal cord testing).
- 7.10 selects appropriate nursing interventions for postoperative spinal surgery:
  - 7.10a principles of positioning (e.g., log rolling, activity restrictions);
  - 7.10b safe use of equipment (e.g., braces, halo vests, collars); and
  - 7.10c prevention and management of potential complications (e.g., atelectasis, cerebrospinal fluid leak, spinal headache, spinal cord compression, neurovascular compromise, paralytic ileus, paralysis).
- 7.11 addresses key elements of discharge preparation following spinal surgery (e.g., physiotherapy, DVT prophylaxis, mobility restrictions, body mechanics).

## Limb Salvage and Amputation

The orthopaedic nurse:

- 7.12 recognizes the underlying conditions that may require limb salvage and amputation (e.g., trauma, tumour, peripheral vascular disease, necrotizing fasciitis, osteomyelitis).
- 7.13 prepares the client for limb salvage and amputation (e.g., client expectations, activity, pre-emptive analgesia, phantom pain, loss and grief).
- 7.14 implements appropriate nursing interventions for postoperative limb salvage and amputation:
  - 7.14a types of pain (e.g., phantom or neuromas for post-amputation, neuropathic for limb salvaging);
  - 7.14b principles of positioning (e.g., lying prone, stump care for amputation);
  - 7.14c safe use of equipment (e.g., prosthetic devices, wheelchair); and
  - 7.14d prevention and management of potential complications (e.g., hip flexion contractures, wound dehiscence for amputation, hemorrhage, infection).
- 7.15 addresses key elements of discharge preparation following limb salvage and amputation (e.g., rehabilitation, psychosocial support, client education).

## Trauma

The orthopaedic nurse:

- 7.16 assesses the mechanisms of traumatic injury (e.g., acceleration and deceleration injury, falls, blunt injury, penetrating injury, crush injury, suicide attempt, rotator cuff, anterior cruciate ligament repairs).
- 7.17 identifies the concurrent injuries that can be associated with specific traumas (e.g., pelvic injuries and urological injuries, seat belt causing internal abdominal injuries, clavicular injuries, spinal injuries and paralysis, bone fractures and increased incidence of venous thromboembolism, head trauma and neurological injuries).
- 7.18 recognizes the goals of the following surgical repair and corrective treatments: internal and external fixation, open and closed reduction, ligament repairs, tendon repairs and arthroplasties, casting, rotator cuff, ACL repairs.
- 7.19 prepares the client for surgery repair following secondary trauma:
  - 7.19a systematic prioritized assessment to ensure all injuries detected (e.g., head-to-toe, system by system);
  - 7.19b educational preparation (e.g., expected postop recovery, continuum of care and expected length of stay in hospital [e.g., pathway], maximizing self-care principles [e.g., promoting independence with activities of daily living];
  - 7.19c psychosocial support; and
  - 7.19d medical preparation (e.g., blood work, diagnostics procedures, X-ray, MRI, CT scan, ultrasound, perfusion scan).
- 7.20 identifies the postoperative management of the client following surgical repair secondary to trauma:
  - 7.20a types of pain (e.g., incisional, tissue, phantom, neuropathic);
  - 7.20b principles of positioning and early mobilization;
  - 7.20c safe use of equipment;
  - 7.20d prevention and management of potential complications (e.g., blood loss, fluid imbalances, urinary retention or infection, deep vein thrombosis, pulmonary embolism, fat embolism, atelectasis, neurovascular compromise, surgical site infection, abdominal distention, hematomas, fracture blisters, swelling); and
  - 7.20e discharge preparation (e.g., equipment and resource needs, medication protocols, follow-up care, education (regarding potential complications, medication administration, use of equipment, follow-up care, insurance company contact, client education, psychosocial support).

### **Pediatric Fractures**

- 7.21 understands the physiologic and biomechanical differences of growing bones: dynamic state of the immature skeleton, typical fracture pattern by age group, growth plate injuries, remodelling, rate of healing.
- 7.22 recognizes the mechanisms of injury for pediatric fractures: supracondylar fracture, greenstick fracture, epiphyseal (growth plate) injuries, presence of associated bone dysplasia or pathology fractures (approximation of fracture components vs perfect reduction).
- 7.23 understands the variation in treatment of pediatric fractures.
- 7.24 addresses the client's and family's learning and psychosocial needs regarding pediatric fractures (e.g., long-term complications, immediate mobility issues, schooling).

### **Abuse-Related Trauma**

- 7.25 assesses the client for abuse-related trauma (e.g., child abuse, elder abuse, spousal abuse).
- 7.26 intervenes appropriately with the client and family in cases of suspected abuse-related trauma (e.g., collects objective data, remains non-judgmental, assesses coping skills, reports to authorities when appropriate and as prescribed by law).
- 7.27 addresses the client's and family's learning and psychosocial needs in cases of suspected abuse-related trauma (e.g., community resources).

### **Hip Fractures**

- 7.28 understands the anatomy and pathophysiology of hip fractures.
- 7.29 identifies the underlying cause of the fall and fracture.
- 7.30 recognizes the goals of hip fracture surgery.
- 7.31 understands the potential risks in surgery delay (e.g., mobility and palliation).
- 7.32 prepares the client for hip fracture surgery:
  - 7.32a educational preparation (e.g., preoperative tests and procedures, unknown time for operative procedure, expected postop recovery and expected length of stay, post-hospital care needs);
  - 7.32b medical preparation (e.g., blood work, diagnostic procedures, other medical consultations); and
  - 7.32c comfort (e.g., positioning, pain management).

- 7.33 identifies the postoperative management of the client following hip fracture surgery:
- 7.33a principles of positioning and range of motion (e.g., abduction, support, alignment, restrictions in flexion or weight bearing);
  - 7.33b early and frequent mobilization;
  - 7.33c safe use of equipment (e.g., walker, abduction pillows or braces);
  - 7.33d functional recovery (e.g., activities of daily living);
  - 7.33e comfort (e.g., positioning, pain management);
  - 7.33f pre-admission health concerns and risk factors that may delay recovery and impede safe discharge (e.g., malnutrition, dementia, depression, environmental hazards in the home, social isolation);
  - 7.33g potential complications (e.g., blood loss, fluid electrolyte imbalance, urinary retention, urinary incontinence, deep vein thrombosis, pulmonary embolism, dislocation, wound infection, delirium, hematomas); and
  - 7.33h discharge preparation (e.g., equipment and resource needs, medication protocols, follow-up care, education regarding potential complications, medication administration, use of equipment, ongoing care needs, pain management, osteoporosis management).
- 7.34 addresses the client's and family's learning needs for clients at risk for future falls (e.g., modification of risk factors in the home, education regarding hip protectors).

## Soft Tissue Interventions

### Skin Graft or Muscle Flap Grafts

- 7.35 recognizes the goals of skin grafts and muscle flap grafts.
- 7.36 recognizes the following surgical techniques: stamp graft, flap graft, free grafts, anchored grafts.
- 7.37 identifies the postoperative management of donor and recipient sites following skin graft and muscle flap grafts:
- 7.37a principles of positioning;
  - 7.37b safe use of equipment;
  - 7.37c potential complications (e.g., infection, circulatory compromise, swelling, wound drainage, pain, immobility); and
  - 7.37d discharge preparation (e.g., equipment and resource needs, medication protocols, follow-up care, education (regarding nutrition, potential complications, medication administration, use of equipment, follow-up care).

**Debridement (Mechanical and Surgical)**

- 7.38 identifies the goals of debridement (e.g., asepsis, preservation of healthy tissues).
- 7.39 implements appropriate interventions to provide care to the client requiring debridement (e.g., pain management, positioning, nutrition).

**Casting and Bracing**

- 7.40 understands the indications for casting and bracing (e.g., immobilization; prevention or correction of deformities; maintenance, support and protection of realigned bones; promotion of healing).
- 7.41 understands the indications of different casting materials such as plaster of Paris, fibreglass, slabs, splints (e.g., immobilization, limb protection, back slabs for initial immobilization of a swollen limb, plaster of Paris following a closed reduction of a wrist).
- 7.42 identifies the common types of casts (e.g., short arm, long arm, short leg, long leg, cylinder, thumb spica, back slab) and their maintenance (e.g., alignment, correct wet cast handling, prevention of skin breakdown, proper limb elevation, keeping cast dry).
- 7.43 prepares the client for cast or brace application (e.g., location of cast, heat generation while applying, drying time).
- 7.44 recognizes key elements of the management of clients with a cast or brace:
  - 7.44a principles of positioning and range of motion and weight-bearing restrictions (e.g., support, alignment, restriction in movement, exercise of all joints not included in cast);
  - 7.44b safe use of equipment and assistive devices (e.g., walker, canes, crutches, pillows, environment modification); and
  - 7.44c prevention and management of potential complications (e.g., DVT, compartment syndrome, nerve impairment, swelling, pressure ulcer, neurovascular compromise).
- 7.45 addresses key elements of discharge preparation following the application of a cast or brace (e.g., equipment or assistive device and resource needs, cast or brace care, pain management, follow-up, education regarding potential complications, proper limb elevation, use of assistive devices, psychosocial support).

**Traction**

- 7.46 understands the indications for traction (e.g., reducing fractures or dislocations, decreasing muscle spasm).
- 7.47 understands the principles of traction (e.g., maintaining alignment, providing countertraction, preventing friction).

- 7.48 identifies the common classifications of traction and their uses (e.g., skin, skeletal, manual).
- 7.49 recognizes key elements of the management of clients in traction:
  - 7.49a principles of positioning and range of motion (e.g., promoting mobility within activity restrictions, exercise of unaffected extremities, maintaining traction and alignment);
  - 7.49b safe use of equipment (e.g., securing knots with tape, keeping weights hanging freely, confirming the amount of weight); and
  - 7.49c prevention and management of potential complications (e.g., skin breakdown, neurovascular compromise, infection, edema, problems related to immobility such as urinary retention and constipation).
- 7.50 addresses the client's psychosocial and learning needs related to traction (e.g., pain management, lifting and turning, coping).

#### **Fasciotomy**

- 7.51 understands the pathophysiology associated with requiring a fasciotomy.
- 7.52 assesses fasciotomy wound healing (e.g., limb temperature, proximal pulse quality, capillary refilling).
- 7.53 prepares the clients for fasciotomy (e.g., client education, psychosocial support).

#### **Bone Graft**

- 7.54 understands the anatomy and pathophysiology associated with various types of bone grafts (e.g., allograft, autograft, synthetic).
- 7.55 assesses progression of wound and graft site healing.
- 7.56 recognizes potential complications that may develop following bone graft procedures (e.g., infection, graft rejection).