

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 Exam is a criterion-referenced exam.¹ 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

A working group of five highly experienced orthopaedic nurses from various regions in Canada revised and updated the current list of competencies during a five-day meeting. The final list of competencies was approved by the Orthopaedic Nursing Certification Exam Committee.

¹ 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

In developing the list of competencies for orthopaedic nurses, the following assumptions were made:

Health

- is influenced by developmental, psychological, physical, cultural, economic and political factors;
- is influenced by prevention and promotion activities along with maintenance and rehabilitation efforts; and
- may change and result in transient or permanent changes or chronic conditions.

The client

- includes individuals, families, groups and communities as defined by the client;
- is accountable for own health;
- has the right to autonomy (including living at risk), respect, dignity, confidentiality, informed consent and access to information; and
- is significantly influenced by access to support and response to condition.

Environment

- includes a variety of settings: home, community and health-care institutions;
- has a major impact on health, care delivery and quality of life; and
- supports the best possible client outcomes by recognizing orthopaedic nursing as a specialty nursing practice.

The orthopaedic nurse

- uses a nursing process that is continuous, comprehensive and holistic and maximizes use of available resources;
- uses a proactive and preventative approach in client care;
- strives for nursing practice that is competent, evidence-informed and maintained through a professional, evaluative and reflective process;
- is responsible for sharing unique knowledge and skills;
- works collaboratively within an interprofessional team and ensures continuity of care;

- pursues professional growth through lifelong learning, skills development and research;
- advocates for ethical and safe quality care; and
- integrates practice in a technologically advancing health-care environment.

Competency Categories

The competencies are classified under a eight-category scheme commonly used to organize orthopaedic nursing.

Some of the competencies lend themselves to one or more of the categories; therefore, these eight 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 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
Knowledge of Orthopaedics		
Anatomy & Physiology	9	7%
Pathophysiology	37	27%
Basics	9	7%
Medication	8	6%
Pain	6	4%
Acute Interventions		
Injury, Exacerbations & Treatments	25	18%
Complications	15	11%
Health Promotion and Optimization	27	20%

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
Knowledge of Orthopaedics	
Anatomy & Physiology	5-15%
Pathophysiology	15-25%
Basics	3-5%
Medication	3-5%
Pain	3-5%
Acute Interventions	
Injury, Exacerbations & Treatments	15-25%
Complications	15-20%
Health Promotion and Optimization	15-25%

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 format) and special functions of exam questions (e.g., case-based or 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 and 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, 70 to 80 per cent of the questions are presented as independent questions and 20 to 30 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 and critical thinking.²

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).

2. Application

This level refers to the ability to apply knowledge and learning to new or practical situation. It includes applying rules, methods, principles and theories in 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 concerning the needs of clients.

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

² These levels are adapted from the taxonomy of cognitive abilities developed in Bloom (1956).

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

Cognitive Ability Level	Percentage of questions on Orthopaedic Nursing Exam
Knowledge/Comprehension	20-30%
Application	40-50%
Critical Thinking	25-35%

Contextual Variables

Client Age and Gender: Two of the contextual variables specified for the Orthopaedic Nursing Certification Exam are age and gender of the clients. Providing specifications for the use of these variables ensures that the clients described in the exam represent the demographics 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 18 years	15-25%	15-25%
19-49 years	25-35%	25-35%
50-79 years	35-45%	35-45%
80+ years	10-20%	10-20%

Client Culture: Questions are included that measure 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. For the purposes of this exam, the health-care environment is specified only when it is required for clarity or in order to provide guidance to the examinee.

Conclusions

The blueprint for the Orthopaedic Nursing Certification Exam is the product of a collaborative effort between CNA, ASI 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 Exam Development Guidelines

Structural Variables	
Exam Length and Format	Approximately 160-165 multiple choice questions
Question Presentation	70–80 % independent questions 20–30 % case-based questions
The Cognitive Domain	Knowledge/Comprehension 20-30% of questions Application 40-50% of questions Critical Thinking 25-35% of questions
Competency Categories	<p>Knowledge of Orthopaedics</p> <p>1) Anatomy & Physiology 5-15% of questions 2) Pathophysiology 15-25% of questions 3) Basics 3-5% of questions 4) Medication 3-5% of questions 5) Pain 3-5% of questions</p> <p>Acute Interventions</p> <p>6) Injury, Exacerbations & Treatments 15-25% of questions 7) Complications 15-20% of questions 8) Health Promotion and Optimization 15-25% of questions</p>
Contextual Variables	
Client Age and Gender	Birth to 18 years 15-25% of questions 19-49 years 25-35% of questions 50-79 years 35-45% of questions 80 + years 10-20 % of questions
Client Culture	Questions are included that measure awareness, sensitivity and respect for different cultural values, beliefs and practices, without introducing stereotypes.
Client Health Situation	In the development of the Rehabilitation Nursing 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 Exam

List of Competencies

A) KNOWLEDGE OF ORTHOPAEDICS

1) Anatomy & Physiology

The orthopaedic nurse:

- 1.1 Understands bone structure, development and function, including:
 - 1.1a physiological and biomechanical differences of growing bones (e.g., dynamic state of the immature skeleton, typical fracture pattern by age group, growth plate injuries, remodelling, rate of healing);
 - 1.1b effects of mobility on the health and healing of bones (e.g., bone growth, weight-bearing status);
 - 1.1c 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); and
 - 1.1d normal body alignment (e.g., varus, abduction, pronation).
- 1.2 Understands joint structure, development and function, including clients at risk for joint stiffness.
- 1.3 Understands muscle, tendon and ligament structure, development and function, including the effects of mobility on the health and healing of muscles (e.g., muscle strength).
- 1.4 Understands the neurovascular system structure, development and function.
- 1.5 Understands the integumentary system structure, development and function.
- 1.6 Understands graft structure, development and function (e.g., skin, muscle, bone).

2) Pathophysiology

The orthopaedic nurse:

- 2.1 Identifies the prevalence of dementia, delirium and depression.
- 2.2 Identifies risk factors and characteristics of:

- 2.2a delirium (e.g., pain, infection, medications, hypoxia, fluid and electrolyte imbalance, unfamiliar environment);
 - 2.2b depression (e.g., prolonged pain, immobility, loss);
 - 2.2c substance withdrawal;
 - 2.2d fracture blisters;
 - 2.2e venous thromboembolic condition (VTE), pulmonary embolism;
 - 2.2f fat embolism;
 - 2.2g neurovascular compromise (e.g., fractures, constriction, traction, mechanism of injury);
 - 2.2h joint instability or dislocation (e.g., joint surgery, trauma);
 - 2.2i contractures;
 - 2.2j muscle atrophy (e.g., disuse, soft tissue or nerve injury); and
 - 2.2k pressure ulcers (e.g., immobility, location, casts and splints).
- 2.3 Understands the pathophysiology associated with the following orthopaedic conditions:
- 2.3a congenital disorders (e.g., hip dysplasia, talipes equinovarus, scoliosis, osteogenesis imperfecta, cerebral palsy, spina bifida);
 - 2.3b developmental disorders (e.g., Osgood-Schlatter, Legg-Calvé-Perthes, slipped capital femoral epiphysis);
 - 2.3c degenerative conditions (e.g., osteoarthritis, chondromalacia patella, spondylolisthesis);
 - 2.3d metabolic disorders (e.g., osteoporosis, osteopenia, osteomalacia, Paget's, rickets, parathyroid, gout);
 - 2.3e inflammatory and autoimmune disorders (e.g., rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, systemic lupus erythematosus, scleroderma);
 - 2.3f oncology disorders (e.g., tumours, pathological fractures).
- 2.4 Identifies the systemic manifestations of rheumatoid arthritis (e.g., ocular, gastrointestinal, cardiopulmonary and musculoskeletal changes).
- 2.5 Understands the factors that influence bone mineral density (e.g., genetics, medications, smoking, viral infection, diet, activity, age).
- 2.6 Identifies the complications associated with overuse of joints (e.g., carpal tunnel, impingement syndromes).
- 2.7 Understands the pathophysiology associated with infections (e.g., septic joint arthritis, tuberculosis, post-polio disease, osteomyelitis, necrotizing fasciitis).

- 2.8 Understands the implications of the mechanism of injury (e.g., acceleration and deceleration, falls, blunt or penetrating, crush).
- 2.9 Understands fracture classifications (e.g., supracondylar, greenstick, epiphyseal, spiral, open).
- 2.10 Understands the pathophysiology of orthopaedic fractures including:
 - 2.10a upper extremities (e.g., Colles);
 - 2.10b lower extremities (e.g., calcaneal);
 - 2.10c pelvis and hip (e.g., acetabular); and
 - 2.10d spine (e.g., compression).
- 2.11 Understands the pathophysiology associated with compartment syndrome.
- 2.12 Understands orthopaedic treatment options (e.g., conservative and surgical).
- 2.13 Recognizes the manifestations of joint instability or dislocation (e.g., pain, shortening of limb, ligament laxity, impaired function).
- 2.14 Understands the pathophysiology of orthopaedic soft tissue injury (e.g., ligament tears, tendon disruption, muscles injury, joint capsule disruption).
- 2.15 Identifies concurrent injuries associated with orthopaedic trauma (e.g., urological, abdominal, thoracic, neurovascular, integumentary).
- 2.16 Recognizes the underlying conditions that may require:
 - 2.16a limb salvage and amputation (e.g., trauma, tumour, necrotizing fasciitis, vascular insufficiency, osteomyelitis);
 - 2.16b arthroplasty surgery (e.g., arthritis, avascular necrosis, trauma, failed joint);
 - 2.16c spinal surgery (e.g., stenosis, tumours, degeneration, congenital, spondylolisthesis, trauma); and
 - 2.16d soft tissue surgery (e.g., quadriceps, hamstring or Achilles tendon repair).

3) Basic

The orthopaedic nurse:

- 3.1 Understands principles of positioning and range of motion (e.g., support, alignment, restriction).
- 3.2 Understands principles of mobilization (e.g., weight-bearing restrictions, health status, cognitive function).

- 3.3 Understands the safe use of equipment and assistive devices (e.g., walkers, canes, crutches, pillows, environment modifications).
- 3.4 Understands classifications and principles of traction (e.g., skin, skeletal, manual, securing knots, assessing weights).
- 3.5 Understands the principles of cast care (e.g., handling of cast, preventing skin breakdown, elevating limb).
- 3.6 Understands the principles of fixation (e.g., arthroplasty, external fixation, intermedullary nail).
- 3.7 Understands the indications for:
 - 3.7a traction (e.g., reducing fractures or dislocations, decreasing muscle spasm, maintaining alignment); and
 - 3.7b casting and bracing (e.g., immobilization, prevention or correction of deformities; maintenance, support and protection of realigned bones; promotion of healing).
- 3.8 Identifies risk factors for the development of general postoperative complications (e.g., respiratory infection, constipation, UTI, nausea and vomiting, urinary retention, fluid and electrolyte imbalance, orthostatic hypotension).

4) Medications

The orthopaedic nurse:

- 4.1 Understands the pharmacological characteristics and principles of:
 - 4.1a analgesics;
 - 4.1b antibiotics;
 - 4.1c anticoagulants;
 - 4.1d biologics and disease modifiers;
 - 4.1e bisphosphonates;
 - 4.1f corticosteroids;
 - 4.1g NSAIDS; and
 - 4.1h antipsychotics.

5) Pain

The orthopaedic nurse:

- 5.1 Understands how the type and extent of pain influences the client's experience (e.g., acute vs. chronic).
- 5.2 Understands the importance of taking a preventative approach to pain (e.g., regular analgesic administration, dosing, chronic pain prevention).
- 5.3 Understands interventions for the management of:
 - 5.3a nociceptive pain (e.g., multi-modal pain medication strategies, non-pharmacological strategies, complementary therapy); and
 - 5.3b neuropathic pain (e.g., multi-modal pain medication strategies, non-pharmacological strategies, complementary therapy).
- 5.4 Recognizes contributory factors to pain presentation (e.g., culture, age, addictions, stage of illness, comorbidities, pre-existing pain experiences).
- 5.5 Identifies consequences of unrelieved pain (e.g., delirium, increased blood clotting, cardiac stress, depression).

B) ACUTE INTERVENTIONS

6) Injury, Treatments & Exacerbations

The orthopaedic nurse:

- 6.1 Addresses the elements of client optimization prior to orthopaedic surgery (e.g., diagnostic procedures, laboratory values, anemia management, physical conditioning).
- 6.2 Assesses the client for abuse-related trauma.
- 6.3 Assesses client for delirium (e.g., substance withdrawal).
- 6.4 Assesses for soft tissue injuries (e.g., sprains, strains).
- 6.5 Assesses for risks related to delay of non-elective surgery (e.g., delirium, pneumonia, pressure sores, constipation).
- 6.6 Assesses for blood loss, hemorrhage and hypovolemic shock.

- 6.7 Manages neurovascular status by:
 - 6.7a assessing extremities (e.g., pain on passive stretch, pallor, paresthesia);
 - 6.7b implementing preventative interventions (e.g., elevation, ice, support);
 - 6.7c implementing interventions for compartment syndrome (e.g., loosening restrictive bandages or casts, limb at heart level, removing ice, hydration, initiating follow-up); and
 - 6.7d addressing the client's learning needs (e.g., reviewing risks and outcomes, encouraging reporting of change in status).
- 6.8 Implements appropriate non-surgical interventions for soft tissue injuries (e.g., rest, ice, compression, elevation, referral to appropriate health-care provider).
- 6.9 Implements appropriate non-surgical interventions to prevent and manage overuse of joints (e.g., proper use of splints, positioning).
- 6.10 Implements interventions for the treatment of blood loss, hemorrhage and hypovolemic shock (e.g., pressure, fluid resuscitation).
- 6.11 Implements appropriate positioning and equipment based on client's condition (e.g., lying prone, arthroplasty restrictions, raised toilet seat, slings, traction).
- 6.12 Monitors the response of the client to anticoagulation therapy (e.g., observing for bleeding, analysing blood values).
- 6.13 Intervenes to prevent and manage:
 - 6.13a peripheral edema;
 - 6.13b contractures (e.g., range of motion, splinting);
 - 6.13c changes in range of motion (e.g., pain control, icing, exercises, continuous passive motion machines); and
 - 6.13d joint instability or dislocation (e.g., bracing, physiotherapy, muscle strengthening).
- 6.14 Implements appropriate interventions for the following orthopaedic conditions (e.g., surgery, bracing, pharmacotherapy, complementary therapies):
 - 6.14a congenital disorders;
 - 6.14b developmental disorders;
 - 6.14c degenerative conditions;
 - 6.14d metabolic disorders;
 - 6.14e inflammatory and autoimmune disorders; and
 - 6.14f oncology.

7) Complications

The orthopaedic nurse:

- 7.1 Assesses for potential complications related to:
 - 7.1a arthroplasty, arthrodesis, internal/external fixation (e.g., dislocations, infections, implant or graft rejections, non-union, hematoma);
 - 7.1b spinal surgeries/injuries (e.g., dural tear, cord compression, paralytic ileus, paralysis, cauda equina);
 - 7.1c limb salvage and amputation (e.g., flexion contractures, hemorrhage, infection, phantom pain);
 - 7.1d cast, brace or traction (e.g., VTE, nerve impairment, skin breakdown, neurovascular compromise); and
 - 7.1e soft tissue injury/wounds (e.g., fasciotomy, fracture blisters, pressure sores, debridement, donor sites and grafts).
- 7.2 Prevents and manages potential complications related to:
 - 7.2a delirium (e.g., substance withdrawal, family involvement, referrals, communication techniques);
 - 7.2b depression (e.g., suicide risk, pain control, communication, referrals);
 - 7.2c VTE (e.g., mobility, stockings, anticoagulation, calf compression devices);
 - 7.2d pulmonary embolism and fat embolism (e.g., administering oxygen, monitoring vital signs, dealing with anxiety, managing pain, notifying physician, preparing for diagnostics and procedures);
 - 7.2e orthopaedic complications (e.g., fracture blisters, implant or graft rejections, cauda equina);
 - 7.2f general postoperative complications (e.g., respiratory infection, constipation, UTI, nausea and vomiting, urinary retention, fluid and electrolyte imbalance, orthostatic hypotension);
 - 7.2g infection (e.g., septic joint, tuberculosis, post-polio disease, osteomyelitis, Clostridium difficile);
 - 7.2h reduced mobility (e.g., assistive devices, nutrition, pain management, deep breathing and coughing, exercise program, skin care);
 - 7.2i soft tissue injuries (e.g., infection, pain, muscle loss, compartment syndrome, rhabdomyolysis, joint laxity, muscle wasting, chronic pain, disfigurement); and
 - 7.2j orthopaedic oncology disorders (e.g., symptom management).

8) Health Optimization And Transitions

The orthopaedic nurse:

- 8.1 Addresses the client's learning needs related to self-care management of:
 - 8.1a degenerative and metabolic disorders (e.g., weight reduction, pain management, exercise);
 - 8.1b congenital and developmental disorders (e.g., information regarding schools and community resources, assistance in achieving maximum independence);
 - 8.1c inflammatory and autoimmune disorders (e.g., joint preservation, stress reduction, medication management);
 - 8.1d orthopaedic oncology (e.g., follow-up care, future implications, community resources); and
 - 8.1e fractures (e.g., mobility issues, long-term complications, schooling).
- 8.2 Addresses the client's learning and psychosocial needs regarding:
 - 8.2a preparation prior to orthopaedic surgery (e.g., physical conditioning, restrictions and precautions, home preparations, expected postoperative recovery, expected length of stay in hospital);
 - 8.2b general postoperative complications (e.g., respiratory infection, constipation, UTI, nausea and vomiting, urinary retention, fluid and electrolyte imbalance, orthostatic hypotension);
 - 8.2c body mechanics, weight-bearing restrictions, traction, assistive devices and exercises;
 - 8.2d fall prevention (e.g., call bell in reach, elimination needs, mobility aids, cordless phone, handrails on stairs, grab bar in bath, polypharmacy);
 - 8.2e dementia, depression, delirium;
 - 8.2f medication management;
 - 8.2g soft tissue injuries, contractures, muscle atrophy, pressure ulcers;
 - 8.2h joint instability or dislocation (e.g., positioning and bracing);
 - 8.2i joint degeneration (e.g., osteoarthritis, rheumatoid arthritis, osteoporosis);
 - 8.2j trauma (e.g., suspected abuse, loss, role changes); and
 - 8.2k palliation and end-of-life care (e.g., symptom management, consultations).
- 8.3 Assesses factors that affect mobility (e.g., use of assistive devices, prefunctional level, home environment, cognitive function, age, medications, pain, injury).
- 8.4 Recognizes the impact of reduced mobility (e.g., life changes, occupation, financial status, activities of daily living, psychosocial condition, physical condition).

- 8.5 Promotes safety of client and staff during transfers, movement and ambulation (e.g., mobility aids, transfer and lift techniques, log rolling).
- 8.6 Recommends strategies and resources to enhance physical health through counselling and education (e.g., smoking cessation, weight reduction, conditioning exercises).
- 8.7 Intervenes to promote proper nutrition (e.g., positioning to facilitate eating, food preferences, nutrients that promote bone and tissue healing, dietitian consult, antiemetics).
- 8.8 Intervenes with the client in cases of suspected abuse-related trauma (e.g., collecting objective data, assessing coping skills, reporting to authorities as prescribed by law).
- 8.9 Addresses key elements of discharge preparation/transitions including:
 - 8.9a equipment and resource needs (e.g., rental equipment, home and convalescence care);
 - 8.9b medication management (e.g., anticoagulation, pain, antibiotics, osteoporosis);
 - 8.9c community resources (e.g., support groups, rehabilitation, drug addiction programs);
 - 8.9d potential complications (e.g., manifestations of infection, wound care, dislocation);
 - 8.9e developmental and age-related stages (e.g., geriatric, caregiver).