

Sports

Physical Therapy

*Description of
Specialty Practice*

*Specialty Council on
Sports Physical Therapy*



American Board of Physical Therapy Specialties

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Acknowledgements

The *Sports Physical Therapy Description of Specialty Practice* was prepared by the members of a subject matter expert (SME) group and members of the Sports Physical Therapy Specialty Council and approved by the American Board of Physical Therapy Specialties (ABPTS), American Physical Therapy Association.

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Throughout this document, the editors have attempted to use language consistent with the *Guide to Physical Therapist Practice* and universally accepted concepts and terminology, without bias to any particular philosophy or school of thought. The references cited with the case scenarios are given only to help the reader understand the specific examples and are not intended to bias any particular school of thought or philosophy. In addition, these references are *not* intended to be inclusive.

The Specialty Council on Sports Physical Therapy encourages your suggestions for improvement of this document. Your input and suggestions will be considered in the development of the next revision. This is a working document and will be modified as necessary.



American Board of Physical Therapy Specialties Specialty Council on Sports Physical Therapy (ABPTS LOGO)

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Introduction

Specialist certification was established to provide formal recognition for physical therapists with advanced clinical knowledge, experience, and skills in a defined area of practice. Certification is achieved through the successful completion of a standardized application and examination process.

History of Specialization in Physical Therapy

1975, the House of Delegates of the American Physical Therapy Association (APTA) approved the concept of specialization and created the Task Force on Clinical Specialization. The task force was charged with identifying and defining physical therapy specialty practice areas and with developing the structure for and function of a board-certified process. Specialist certification was established to provide formal recognition for physical therapists with advanced clinical knowledge, experience, and skills in a defined area of practice. Certification is achieved through the successful completion of a standardized application and examination process.

The document developed by the task force, *Essentials for Certification of Advanced Clinical Competence in Physical Therapy*, was adopted by the House of Delegates in 1978. At that time, the House recognized 4 specialty areas: cardiovascular/pulmonary, neurology, orthopedics, and pediatrics. In 1979, the House appointed the Commission for Certification of Advanced Clinical Competence. Specialty councils for each of the 4 specialty areas were appointed and charged with the development of competencies unique to each area of advanced clinical practice. In 1980, the commission became the Board of Certification of Advanced Clinical Competencies (BCACC). The House of Delegates recognized 2 additional specialty areas in the same year: sports and clinical electrophysiology. The House of Delegates revised *Essentials for Certification of Advanced Clinical Competence in Physical Therapy* in 1985, and the name was changed to *Essentials for Certification of Physical Therapist Specialists*. The BCACC was renamed the American Board of Physical Therapy Specialists (ABPTS), and the first specialty examination was administered in cardiovascular/pulmonary physical therapy that same year. The specialty area of geriatrics was approved in 1989. In June 2006, the House of Delegates approved women's health as the newest area of physical therapist specialist practice.

History of Specialization in Sports Physical Therapy

The Sports Physical Therapy Section began work on the development of the initial advanced competencies in the mid 1970s. A competency committee performed a task analysis between 1978 and 1979 in order to identify the clinical task(s) in which competency is essential to practice sports physical therapy and to determine to what extent Sports Physical Therapy Section members were practicing those tasks. The results of the initial task analysis were published by Skovly in 1980.¹ From this study, 18 competency statements were developed. Fifteen of those statements concerned clinical skills; the other 3 concerned administration, education, and research.

The Sports Physical Therapy Section initially petitioned the Board for Certification of Advanced Clinical Competence for recognition as a specialty area in 1981. The American Physical Therapy Association House of Delegates approved sports physical therapy as an area of specialization that same year.²

Following approval as an area of specialization, a second major study was conducted to clarify initial task analysis results. The purpose of this second study was to validate the original competency statements. The validation study completed by Krugh³ determined the level of preparation at entry into the profession to perform the advanced competencies and the level of importance of each of these statements to the practice of sports physical therapy.

The American Board of Physical Therapy Specialties requires that each specialty area revalidate its competencies at least every 10 years to assess if there is any change in the scope of practice. In 1991, a revalidation study was initiated. Completed in 1992, this study identified 30 different competency statements in 9 different areas. The new *Sports Physical Therapy Description of Advanced Clinical Practice* was developed and approved by ABPTS in 1994.

The first edition of the *Guide to Physical Therapist Practice* was published in 1997.⁴ This document was designed to describe physical therapy practice in the context of the Nagi disablement model. The Guide describes the patient/client management model as including patient/client examination, evaluation, diagnosis, prognosis, intervention, and outcomes. The Guide also standardizes terminology used in physical therapy practice, and describes preferred practice patterns in four categories of conditions: musculoskeletal, neuromuscular, cardiovascular/pulmonary, and integumentary. A second edition of the Guide was published in 2001.⁵

In 2001, a third revalidation study of specialty practice in sports physical therapy was initiated. The purposes of this study were to assess the currency of the competency statements regarding the practice of sports physical therapy and to ensure that the updated *Sports Physical Therapy Description of Specialty Practice* (DSP) was consistent with the Guide to Physical Therapist Practice, 2nd Edition.⁵ A group of experts in sports physical therapy convened in 2001 to create a survey instrument. This survey was pilot tested and revised, and the final survey was distributed in summer 2002. A second meeting of subject-matter experts occurred in the spring of 2003 to discuss the results of the survey and to rewrite the DSP. This document is a result of a fourth revalidation study of the specialty practice in sports physical therapy that was initiated in 2010 and approved by ABPTS in 2013.

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Chapter 1: Description of Sports Physical Therapy Board-Certified Specialist Respondents

The following figures contain the descriptive demographic information of the 259 survey respondents who indicated they were board-certified sports clinical specialists. While the American Board of Physical Therapy Specialties collects similar data on all newly board-certified or recertified specialists, this demographic data represents those who responded to the practice analysis survey.

Figure 1. Current Age

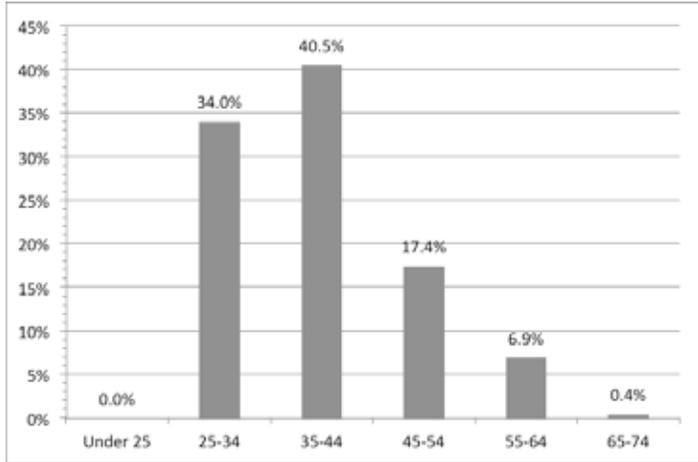


Figure 3. Ethnicity

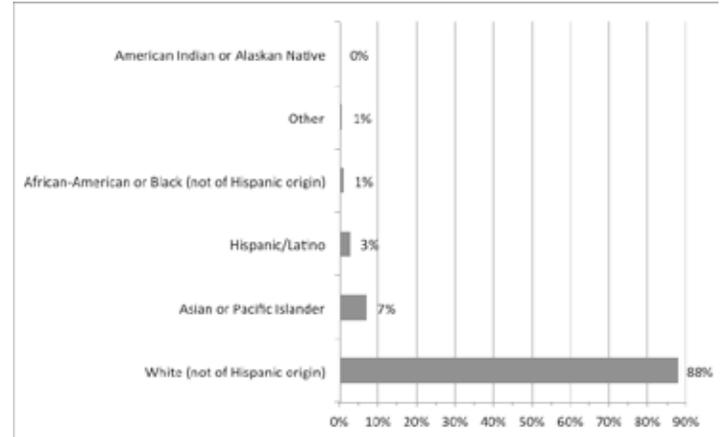


Figure 2. Sex

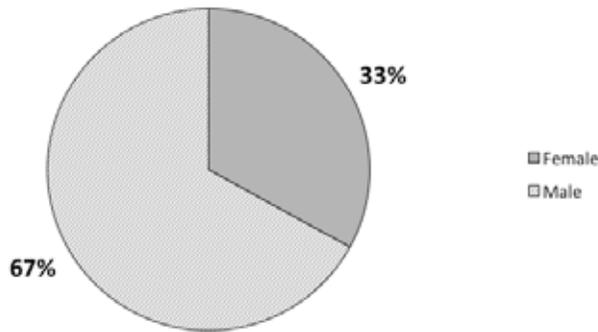


Figure 4. Highest Earned Professional Degree

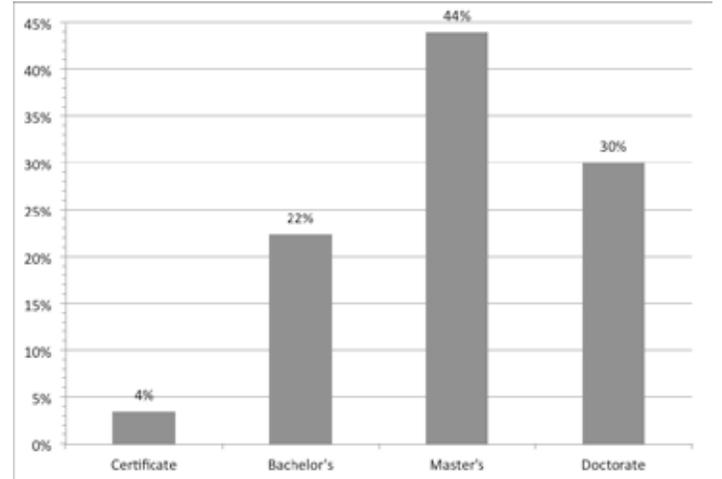


Figure 5. Highest Earned Academic Degree

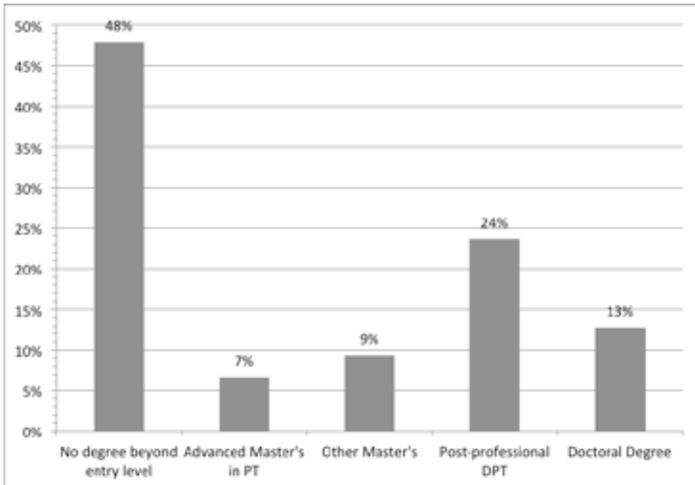


Figure 7. Type of Practice Facility

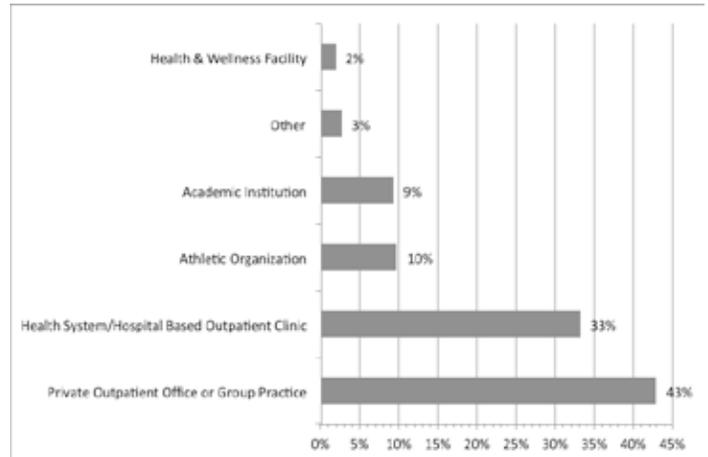


Figure 6. Years of Practice in Physical Therapy

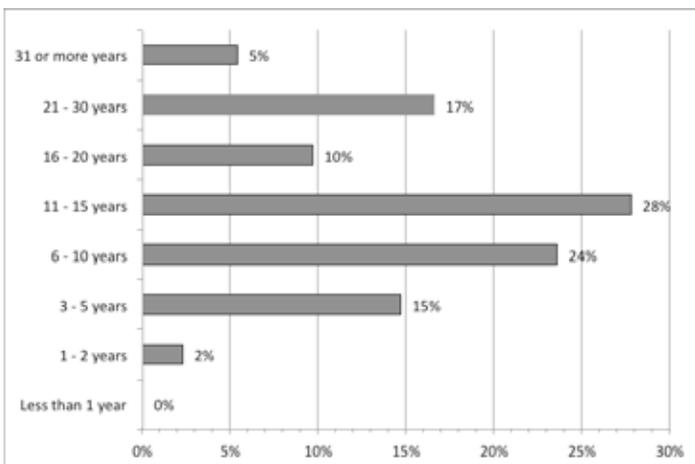


Figure 8. Median Percentage of Time Spent in Professional Activities

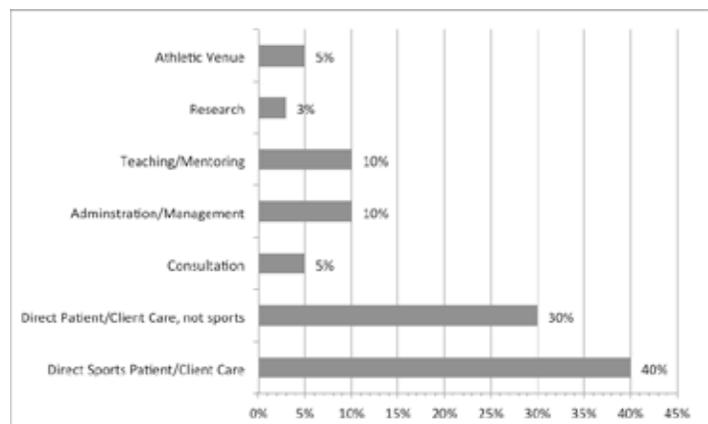


Figure 9. Provides Services in Athletic Venues

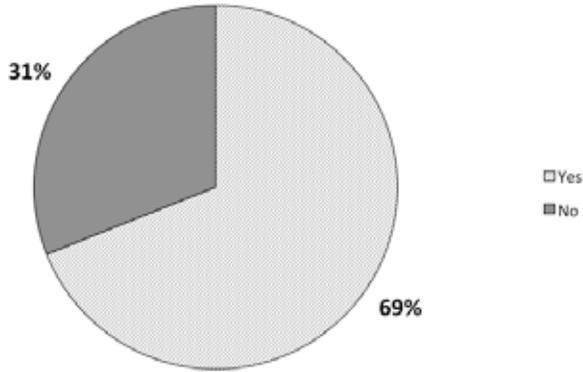


Figure 11. Respondents Who Completed a Credentialed Sports Physical Therapy Residency

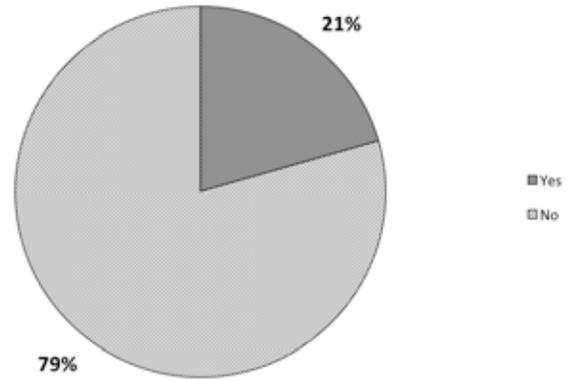


Figure 10. Sport Category in Which Specialists Provide Athletic Venue Services

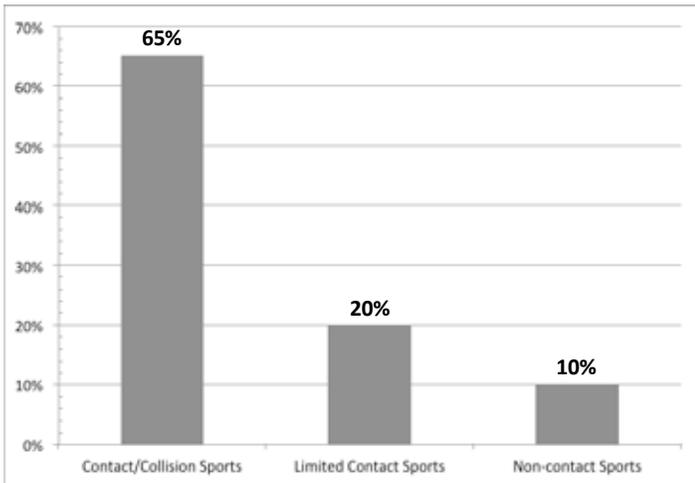


Figure 12. Respondents Who Have Additional Certifications*

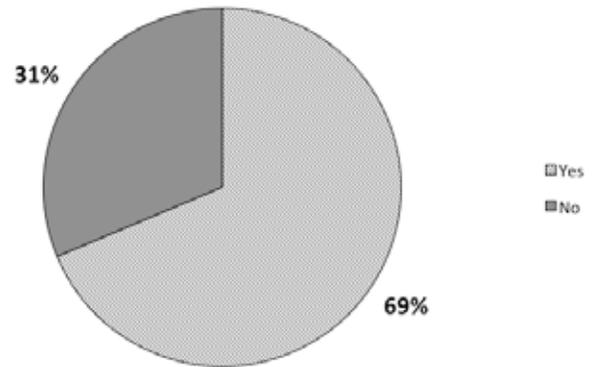


Figure 13. The 3 Most Common Additional Certifications

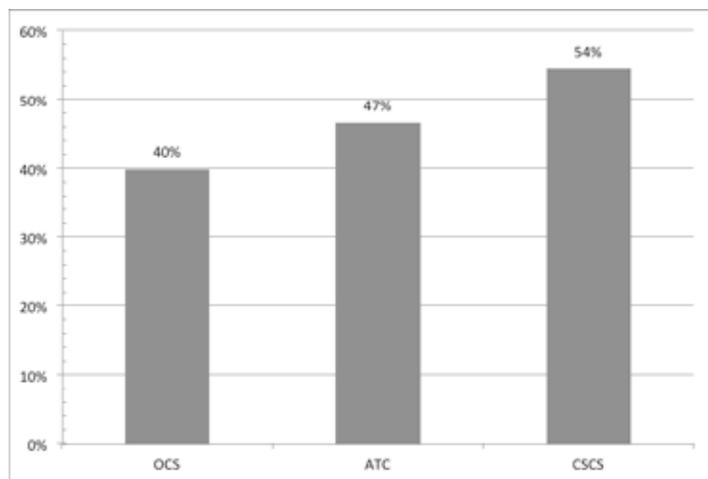


Figure 15. Referral Sources

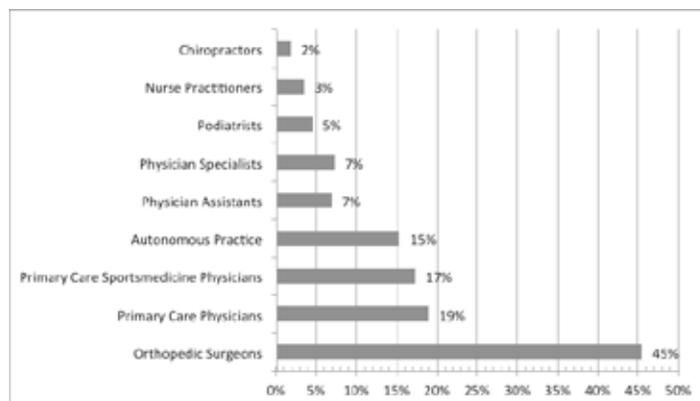


Figure 14. Patients/Clients Treated Per Day

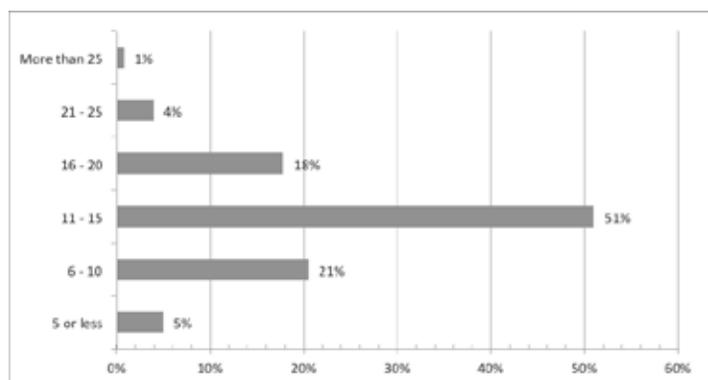
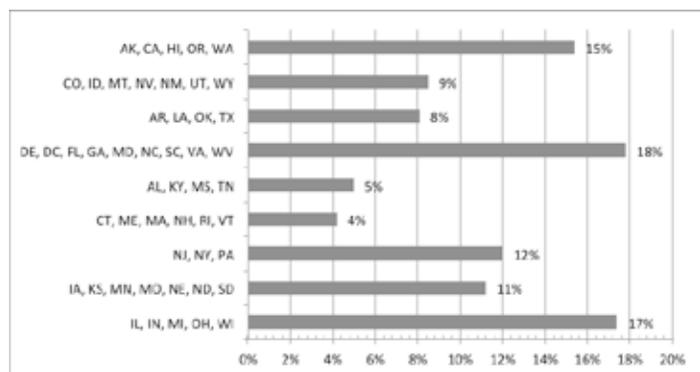


Figure 16. Geographic Representation of Respondents



Chapter 2: Description of Board-Certified Specialty Practice in Sports

This Description of Specialty Practice (DSP) describes the practice of board-certified sports physical therapy clinical specialists. It is based on survey responses of 414 participants: 259 board-certified sports clinical specialists, 35 members of the Sports Physical Therapy Section of APTA who are not specialists, and 120 physical therapists who did not indicate their specialist status. The process of revalidation of the DSP is conducted every 10 years, and the last revision of the Sports DSP was published in 2002.¹ Weber et al² described the detail of that practice analysis process.

Specialty board certification is one mechanism to stimulate the development of expert practice in physical therapy. Expert clinicians demonstrate different reasoning processes from novices, based on their knowledge, experience, and reflective behaviors.³⁻⁷ This refinement in reasoning skills and patient management should result in greater efficiency and effectiveness in providing patient care in their area of specialization. This has been shown to be the case in a group of orthopedic clinical specialists.⁸

The patient/client management model described in the *Guide to Physical Therapist Practice*⁹ is the accepted standard for physical therapist practice, including sports physical therapy specialty practice. This DSP highlights the specific components of physical therapist practice that sports clinical specialists use, based on the perceptions of the survey respondents and a group of subject matter experts. As sports physical therapy specialty practice is a subset of physical therapist practice, this DSP does not include all of the practice areas covered in the Guide.

The foundation of sports physical therapy specialty practice requires a comprehensive declarative and procedural knowledge for practice. This foundational knowledge and practice is critical to the development of advanced clinical competence. These knowledge and practice content areas include the following:

Foundational Knowledge

- Human Anatomy and Physiology
 - Musculoskeletal system
 - Neuromuscular system
 - Cardiovascular and pulmonary systems
 - Integumentary systems
 - Other systems: endocrine, reproductive, and digestive
 - Histology (eg, connective tissue, muscle, nerve, bone)
 - Physiology of exercise and sport-specific physiological demands

- Movement Science
 - Biomechanics and kinesiology
 - Motor learning and control
 - Gait (walking and running) and locomotion
- Pathology and Pathophysiology
 - Symptoms/signs of injury/disease
 - Disease epidemiology
 - Inflammation, tissue healing, and repair
 - Pathomechanics
- Medical and Surgical Intervention
 - Imaging studies (eg, plain radiographs, bone scan, MRI, US, CT)
 - Ancillary tests (eg, EMG, EKG, lab studies)
 - Pharmacology
 - Surgical procedures
- Health and Wellness
 - Nutrition
 - Psychological issues relating to performance and injury
 - Basic parameters of fitness
- Critical Inquiry
 - Research design and methods, including statistical concepts
 - Research findings specific to sports physical therapy practice

Foundational Practice

- Ethical conduct in practice and research
- Legal compliance, including scope of practice
- Administration and management principles in practice

Advanced practice in sports physical therapy requires certain knowledge, skills, and behaviors. In this document, the term “athlete” should be understood to indicate physically active individuals who span the spectrum across age, race/ethnicity, illness or injury condition, and level of ability/disability. Based on participant responses to the practice survey and the opinions of a panel of subject-matter experts, key competencies were modified and reorganized to reflect contemporary sports specialty practice. The practice expectations of a sports clinical specialist have been organized below into 6 competency areas. Each competency area is further subdivided into specific professional behavioral objectives.

I. Rehabilitation/Return to Sports

These activities of the board-certified sports specialist are concerned with the rehabilitation of athletes with impairments, activity limitations, or participation restriction focus on the return of athletes to their sport activities. Such activities include:

A. Examination, Evaluation, and Diagnosis

1. Examine, evaluate, and diagnose considering sport-specific injury epidemiology (incidence/prevalence), sports-specific biomechanical demands, comorbidities, and other identified risk factors
2. Identify history of athlete's major complaint(s) with regard to severity, chronicity, impairment, activity limitations, participation restrictions, level of irritability/severity, previous therapeutic interventions, and emotional response to current condition
3. Perform systems review to assess physiologic and anatomic status, cognition, and communication skills
4. Select functional outcome measures to determine baseline status and assess response to intervention
5. Select and perform tests and measures that are comprehensive and consistent with history and systems review to include but are not limited to:
 - a) Aerobic capacity/endurance (eg, treadmill/ergometer submaximal and maximal stress testing)
 - b) Anthropometric characteristics (eg, body composition, body dimensions—height, weight, girth, edema)
 - c) Arousal, attention, and cognition (eg, assessment of factors that influence motivation level, levels of consciousness)
 - d) Assistive and adaptive devices (eg, assessment of appropriateness, alignment and fit, safety)
 - e) Circulation (eg, pulses, vertebral artery examination, screen for circulatory abnormalities)
 - f) Cranial nerve integrity
 - g) Peripheral nerve integrity
 - h) Environmental considerations (eg, weather, altitude, venue conditions)
 - i) Assessment of sport-specific biomechanics (eg, kinetic, kinematic, task analysis)
 - j) Gait and locomotion (eg, running and walking analysis)
 - k) Static and dynamic balance (eg, sport-specific movements)
 - l) Integumentary integrity (eg, skin characteristics, wound assessment, characteristics of infectious agents)
 - m) Joint integrity and mobility (eg, assessment of abnormal joint mobility including passive range of motion, joint play movements, response to manual provocation)
 - n) Motor function (eg, motor control, motor learning)
 - o) Muscle performance (eg, instrumented and non-instrumented strength, power, and endurance assessments, sport-specific functional muscle testing)
 - p) Neural mobility (eg, neural limb tension tests)
 - q) Orthotic, protective, and supportive devices (eg, assessment of appropriateness, remediation of impairment, athletic equipment alignment and fit, safety)
 - r) Pain, fear avoidance, and kinesiophobia assessment
 - s) Posture (eg, body or body segment(s) structure, alignment, changes in different positions, body contours)
 - t) Prosthetic devices (eg, assessment of appropriateness, compliance, remediation of impairment, alignment and fit, safety)
 - u) Range of motion including muscle length
 - v) Reflex integrity (eg, assessment of normal and pathological reflexes)
 - w) Sensory integration (eg, assessment of dexterity, coordination, and integration of somatosensory, audiovisual, and vestibular systems)
 - x) Ventilation and respiration/gas exchange (eg, breathing patterns, chest wall mobility, perceived exertion, pulmonary function testing)
6. Sequence tests and measures appropriately based on athlete's condition
7. Recognize strengths or limitations of tests and measures based on measurement properties of sensitivity, specificity, likelihood ratio, validity, and reliability
8. Evaluate and interpret all examination data
9. Organize data into recognized clusters, syndromes, or pathoanatomical categories, based on the examination

10. Establish a physical therapy diagnosis including nature of complaint, probable cause, anatomical structures involved and stage of the condition
11. Identify possible conditions that require consultation with or referral to another health care provider
12. Recognize appropriate imaging and laboratory tests for the injured athlete; recommend appropriate tests in consultation with other health care professionals; understand limitations, indications, and contraindications of these tests; and interpret these tests in consultation with other health care professionals

B. Prognosis, Intervention, and Outcomes

1. Prognosis

- a) Determine appropriateness of physical therapy intervention, including need for referral to other health care professional
- b) Establish a prognosis including the expected level of improvement in function and the amount of time needed to reach that level
- c) Respond to emerging data from reexamination and response to interventions by modification and redirection of intervention as needed
- d) Select validated functional outcome tools, when available, to determine initial and long-term responses to intervention
- e) Determine the extent of injury and possible sequelae to appropriately determine whether the athlete has the ability to continue participation without incurring further injury

2. Intervention Planning

- a) Design comprehensive intervention program to safely return the athlete while minimizing the risk of reinjury
- b) Select and prioritize specific interventions based on impairments, activity limitations, and participation restrictions
- c) Develop and implement sport-specific, performance-based functional progression programs
- d) Implement functional tests to determine athlete's ability and readiness to return to sports activities
- e) Perform appropriate measurements of the musculoskeletal, cardiovascular/pulmo-

nary, integumentary, and neuromuscular systems to determine the athlete's status, progress, and required modifications in the rehabilitative program

- f) Select and apply appropriate orthotic or supportive devices to minimize acuity of injury and facilitate recovery and return to sport
- g) Adapt/adjust sports participation and rehabilitation based on disability considerations including prosthetic and adaptive equipment use

3. Procedural Interventions

- a) Therapeutic exercise instruction to improve muscle performance, joint mobility, muscle length, and aerobic capacity/endurance
- b) Motor function training (eg, balance, coordination and agility training, body mechanics and postural stabilization, gait, locomotion training)
- c) Muscle performance training (eg, strength, power, and endurance training)
- d) Aerobic capacity/endurance conditioning and reconditioning
- e) Manual therapy techniques, including joint mobilization and manipulation
- f) Passive range of motion
- g) Soft tissue mobilization (eg, therapeutic massage, connective tissue massage, deep friction, cross friction) and manual therapy (eg, manual traction, mobilization/manipulation, passive range of motion)
- h) Electrotherapeutic modalities (eg, biofeedback, high-volt stimulation, interferential current, TENS, iontophoresis, functional and neuromuscular electrical stimulation)
- i) Physical agents (eg, ultrasound, cryotherapy, deep thermal, hydrotherapy, superficial thermal)
- j) Functional training in sport activity
- k) Prescription, application, and/or fabrication of prosthetic, orthotic, protective, and supportive devices and adaptive equipment
- l) Integumentary repair and protection

4. Educational Interventions
 - a) Counsel athletes, parents, coaches, and administration regarding safe return to sport
 - b) Patient/client education on diagnosis, prognosis, intervention, responsibility, and self-management within plan of care
 5. Outcomes
 - a) Determine and implement sport-specific criteria and recommendations regarding the athlete's readiness to return to sport
 - b) Recommend level of athlete's sports participation based on results of sport-specific testing
 - c) Remediate athlete's sports and daily living limitations based on best available evidence and athletic variables (eg, history, diagnosis, complications, sporting activity)
- i) Integumentary injuries (eg, lacerations, abrasions, nail bed injuries)
 - j) Genitourinary injuries (eg, testicular torsion, direct trauma)
2. Knowledge of venue-specific emergency action plan
- B. Prognosis, Intervention, and Outcomes
 1. Use published criteria for return to sport, when available, to make return-to-sport decisions
 2. Determine if the athlete can return to sport based on information obtained during the initial and subsequent evaluations and on legal standards
 3. Provide emergency care, management of injury, and transport as necessary
 4. Advise parents, coaches, and administration as to the signs and symptoms of a worsening condition if athlete is not referred for medical or psychological evaluation
 5. Inform athletes, parents, coaches, and administration of the return-to-sport criteria

II. Management of Acute Injury/Illness

These activities of the board-certified sports specialist are concerned with the immediate management of acute injury or illness associated with athletic activity. Such activities include:

- A. Examination, Evaluation, and Diagnosis
 1. Recognize acute injuries and illnesses that require immediate medical intervention, and make appropriate decisions regarding emergency care for the following conditions:
 - a) Cervical, thoracic, and lumbar spine injuries
 - b) Head and facial injuries (eg, concussion, eye, maxillofacial, ear)
 - c) Environmental injuries (eg, cold, heat, altitude, lightning)
 - d) Musculoskeletal injuries (eg, fractures, dislocations)
 - e) Abdominal organ injuries (eg, spleen rupture, liver laceration)
 - f) Pulmonary conditions (eg, pneumothorax, hemothorax, status asthmaticus)
 - g) Cardiovascular conditions (eg, dysrhythmias, sickle cell traits, hypertrophic cardiomyopathy, myocardial infarction, commotio cordis)
 - h) Anaphylaxis

III. Medical/Surgical Considerations

These activities of the board-certified sports specialist are concerned with the medical and surgical management of athletes. Such activities, performed in concert with other health care professionals, include:

- A. Examination, Evaluation, and Diagnosis
 1. Correlate clinical findings with imaging studies and ancillary tests (eg, lab tests, EMG, NCV, EKG) performed
 2. Evaluate an athlete's metabolic and physiologic responses to viral and bacteriological diseases, including gastrointestinal, cardiovascular and pulmonary, endocrine, genitourinary, and dermatological conditions
 3. Evaluate an athlete with consideration of existing injury/illnesses (eg, asthma, diabetes, female triad, GI disorders, hypertension)
 4. Design and evaluate rehabilitation programs based on the goals and principles of surgical techniques for athletic injuries within the indications and contraindications of the surgical techniques

B. Prognosis, Intervention, and Outcomes

1. Provide management and, as needed, return-to-sport recommendations for athletes presenting with existing medical conditions (eg, asthma, diabetes, hypertension, infectious disease, integumentary, female triad, GI disorders)
2. Assess athlete's adherence to established illness management plan
3. Refer to other health care professionals as needed for reassessment of established management plan
4. Counsel athletes, parents, coaches, and administrators as to the impact of pharmacokinetics and pharmacodynamics on the athlete and his/her participation in athletics
5. Counsel athletes, parents, and coaches as to the medical/surgical considerations and the impact on the athlete's current and future participation in athletics
6. Counsel athletes, parents, and coaches regarding the interventions for various infectious diseases, including interventions for preventing the spread of disease among team members

IV. Injury Prevention

These activities of the board-certified sports specialist are concerned with injury/disease prevention for athletes. Such activities include:

A. Examination, Evaluation, and Diagnosis

1. Plan, coordinate, and/or administer preparticipation physical examinations for the purpose of screening for and recognizing medical conditions or injuries that might affect or preclude the athlete's participation
2. Perform systems review and screening examination for possible medical conditions including but not limited to cardiac, metabolic, pulmonary, and female triad issues
3. Assess sport-specific fitness status (eg, aerobic or anaerobic capacity, endurance, acceleration and power, muscle performance, range of motion, balance/proprioception, movement analysis)
4. Monitor environmental conditions and promptly determine the impact of the conditions on the participant and spectator safety

B. Prognosis, Intervention, and Outcomes

1. Design and implement sport-specific training programs
2. Educate athletes, parents, coaches, and administrators regarding appropriate training principles, participation, physical limitations, equipment, or

other areas that affect the health and well-being of athletes

3. Provide recommendations on lifestyle and activity modifications for athletes with chronic conditions (eg, female athlete triad, diabetes, asthma, hypertension)
4. Design and conduct preventive conditioning programs for in-season and off-season based on the individual athlete's needs and sport demands
5. Implement measures to maximize participant/spectator safety in environmentally stressful conditions (eg, lightning risk, acclimatization, appropriate clothing, hydration, nutritional strategies to avoid heat or cold injuries)
6. Educate athletes, parents, coaches, and administrators on injury prevention and potential safety risks
7. Select, fit, and maintain appropriate sport-specific equipment in recognition and acceptance of National Operating Committee on Standards for Athletic Equipment (NOCSAE)

V. Sports Performance Enhancement

These activities of the board-certified sports specialist are concerned with maximizing the athlete's sport performance, including training considerations and the effect of such factors as nutrition and environment on performance. Such activities include:

A. Examination, Evaluation, and Diagnosis

1. Assess human performance (eg, testing and measuring speed, acceleration, VO_2max , power, and other performance indicators)
2. Interpret human performance assessment to design an appropriate conditioning program
3. Develop and implement rehabilitation programs designed to enhance overall human performance and sports specificity
4. Evaluate environmental conditions, determine the effect the conditions will have on performance, and modify athletic performance accordingly

B. Prognosis, Intervention, and Outcomes

1. Develop rehabilitation and performance enhancement guidelines and timelines based on the science supported within the literature
2. Educate and counsel athletes, parents, coaches, and administrators on sports nutrition issues including:
 - a) Macro and micronutrients and dietary supplements

- b) Appropriate hydration strategies for pre-, during, and post-training or competition
 - c) Appropriate electrolyte replenishment strategies during or following training or competition
 - d) Appropriate nutrition strategies for before, during, and after training or competition
 - e) Management of nutritional deficiencies, disordered eating, and eating disorders
 - f) Management of weight gain and loss issues related to athletic participation (eg, wrestling, American football, female athlete)
 - g) Risks and dangers related to performance enhancement substances (eg, hormones, prohormones, blood doping)
 - h) Banned substances common to Olympic, collegiate, and professional sports
3. Educate and provide recommendations to athletes, parents, and coaches regarding performance enhancement principles related to training, ability, and equipment impacting the health and well-being of the athletes

C. Ethical and Legal Standards

- 1. Practice in accordance with ethical and legal standards
- 2. Identify the administrative and legal requirements to dispense medications
- 3. Identify ethical considerations related to return-to-sport activities
- 4. Maintain ethical standards in the conduct of research and dissemination of findings

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VI. Professional Roles and Responsibilities

These activities of the board-certified sports specialist are concerned with maintaining current knowledge, applying principles of evidence-based practice, contributing to the body of knowledge, and fulfilling administrative responsibilities. These activities include:

A. Critical Inquiry

- 1. Maintain state-of-the-art knowledge and skill by participating in continuing professional development (eg, residency education, journal clubs, continuing education courses, professional meetings)
- 2. Apply principles of evidence-based practice in all aspects of care
- 3. Contribute to the body of knowledge of sports physical therapy, including conducting research and disseminating findings

B. Administration

- 1. Promote sports physical therapy to other health care professionals and the public
- 2. Identify the administrative oversight necessary for event coverage and emergency preparedness, including coordination of EMS services

Chapter 3: Case Scenarios

This chapter will assist the candidate in self-assessment of the competency areas for the Sports Physical Therapy Specialist Examination. The sample questions for each case are written to represent the different levels of thinking (recall, comprehension, application, analysis, synthesis, and evaluation) required for the specialist examination. The questions are not intended to emphasize specific content areas but rather to provide guidance regarding the integration of knowledge, clinical experience, and scientific evidence expected of the sports clinical specialist.

The questions within the case scenarios are arranged by the applicable competency domain. This organization is intended to help the candidate understand the linkages between the basic and clinical sciences, the patient/client management model, and critical inquiry within the competency areas. The candidate is encouraged to read the scenario, carefully consider the answer choices, and construct a rationale for his or her answer choice. This rationale can then be compared with the rationale provided by the question author.

Case Scenario 1

A sports clinical specialist is providing sideline coverage for a collegiate soccer game. During the first half of the game, a 22-year-old male soccer player goes up for a head ball and is struck in the face by the elbow of another player. He falls to the ground covering his face and nose with his hands. The referee immediately calls the sports clinical specialist on the field. When the physical therapist gets to the athlete he is conscious, lying on his side, and bleeding from his nose.

Acute Injury/Illness Management

Question 1 for Case Scenario 1

Which of the following tests is most likely to rule out an injury to the cervical spine?

- Reflex testing of the upper extremities
- Cranial nerve testing
- Motor and sensory testing of the upper extremities/lower extremities
- Torg ratio testing

The correct answer is **c**.

Examination, evaluation, and intervention management of cervical spine injury is an extremely important aspect of on-the-field care. The sports clinical specialist should be able to manage this situation. Initial examination, evaluation, and intervention of an athlete with a cervical spine injury can greatly affect the ultimate outcome.¹ The most appropriate test listed in the possible answers is “motor and sensory testing of the upper extremities/lower extremities.”¹ The choice of “reflex testing of the upper extremities”

could be part of the exam, but it would be performed if abnormalities were revealed during the initial motor and sensory testing of the upper extremities/lower extremities. “Cranial nerve testing” is also not specifically related to cervical spine injury but could be part of a complete neurological examination that was performed later in the management of the athlete. Torg ratio testing is a radiological measurement technique that is not considered an on-the-field evaluation.

After ruling out possible cervical spine injury, further examination reveals the athlete has no recollection of the injury incident but is otherwise oriented to time and place. Epistaxis is controlled with nasal compression, but the athlete complains of persistent facial pain and frontal headache. The posttraumatic amnesia persists for 30 minutes.

Question 2 for Case Scenario 1

Which of the following is the most appropriate action by the sports clinical specialist?

- Do not allow the athlete to return to play, and activate EMS immediately.
- Allow the athlete to return to play immediately, but closely observe his behavior.
- Allow the athlete to return to play in the second half of the game.
- Do not allow the athlete to return to play, and monitor mental status and vitals every 5 minutes.

The answer is **d**.

It is not imperative that EMS be activated at this time. Based on clinical examination, cervical spine injury has been ruled out, and bleeding has been controlled. While the athlete is complaining of some facial pain, there is no reason to consider this a medical emergency that requires immediate transport to the hospital. The athlete is showing persistent signs of neurological involvement, ie, posttraumatic amnesia. This would preclude the athlete from any return to play in this contest. Regardless of which concussion grading scale is used, the basic evaluation indicates the presence of a low- to mid-grade concussion. However, it is important for the sports clinical specialist to continue to monitor the athlete for increasing neurological signs. Any increase in neurological signs might be a symptom of a progressing head injury that would require immediate medical attention.^{2,3}

Rehabilitation/Return to Activity

One week later, the athlete asks for permission to return to play. He says that he had nausea, headaches, and difficulty concentrating and reading in class for 3 days after the incident, but these symptoms have resolved.

Question 3 for Case Scenario 1

Which of the following criteria is the sports clinical specialist most likely to use to determine whether this athlete be allowed to return to play?

- Normal findings on neuropsychological testing at 1 week after the incident.
- No symptoms on provocative testing 1 week after his symptoms resolved.
- No headache or posttraumatic amnesia 1 week after the incident.
- Normal findings on brain imaging studies 1 week after his symptoms resolved.

The answer is **b**.

In determining return to play following this grade of concussion, it is imperative that no decisions be made until the athlete has gone at least 1 week with no neurological symptoms. Time post-incident is not important when compared with time with no neurological symptoms. When the athlete has gone 1 week without symptoms, then provocative testing, ie, exertional activities such as running and push-ups, should be initiated to determine if any symptoms return.^{3,4}

Medical/Surgical Considerations*Question 4 for Case Scenario 1*

What imaging modality is most appropriate for use with an athlete with acute concussive symptoms?

- CT scan
- MRI
- Head and cervical spine radiographs
- PET scan

The answer is **a**.

A CT scan is the most appropriate imaging modality due to its ability to show the presence of fluid, such as blood, in this situation. It is superior to the other 3 modalities in its ability to image blood in and around the brain.⁵

Injury Prevention*Question 5 for Case Scenario 1*

Which of the following impact mechanisms has the *least* likelihood of causing a head injury in a soccer player?

- Collision between 2 players heading the ball
- Collision between the goalkeeper and the goal post
- A player heading the ball using proper technique
- A ball kicked against the head of a player

The answer is **c**.

A review of the literature has offered no support of the idea that proper heading of the ball in soccer leads to concussion or cognitive dysfunction. Injury is much more likely to occur with head-to-head contact or head-to-ground contact.⁶ It is also possible that a forcefully kicked ball that strikes a player's head (but not a purposeful "heading" by the player) could offer enough force to precipitate a head injury.⁵

Question 6 for Case Scenario 1

Which of the following mouthpieces is likely to be most effective in decreasing the severity of head injury?

- Stock mouthpiece covering the incisors and canine teeth
- Custom air extraction mouthpiece covering the incisor teeth to the molars
- Boil-and-bite mouthpiece covering incisor teeth to the premolars
- Stock mouthpiece covering all of the mandibular teeth

The correct answer is **b**.

For a mouthpiece to offer any aid in reducing the incidence or severity of concussions, it is important for that mouthpiece to be properly fitted, made of appropriate materials, and of appropriate thickness in the posterior occlusal areas, such as the molar-to-molar contact area.⁷ Answers **a** and **c** describe mouthpieces that do not offer separation in the posterior occlusal areas. Answer **d** describes a mouthpiece that is not properly fit.

Professional Roles and Responsibilities*Question 7 for Case Scenario 1*

A neuropsychological test is described to identify impaired cognitive function in athletes with brain injury. The test accuracy data are as follows:

Sensitivity:	36%
Specificity:	92%
Likelihood ratio (-):	0.7
Likelihood ratio (+):	4.5

Which of the following test results is most clinically useful?

- A positive result, ruling in the condition
- A negative result, ruling out the condition
- Both a negative and a positive result are clinically useful
- Neither a negative nor a positive test result is clinically useful

The correct answer is **a**.

The sports clinical specialist should be knowledgeable in the area of diagnostic test accuracy. Test sensitivity and specificity are calculated based on the comparison of the results of the test of interest and a reference standard. The likelihood ratio (LR) is calculated from the sensitivity and specificity values. Sensitivity and specificity values predict the probability of a correct finding based on the reference standard. However, in the clinical setting clinicians have a test result and want to predict the likelihood of the test result being correct. The LR indicates the shift in odds from a positive or negative result. A large positive LR indicates a greater likelihood that the condition is present in the case of a positive test. A small negative LR indicates a greater likelihood that the condition is absent in the case of a negative test. The measurement characteristics of the test in this example suggest that the most clinically useful finding is a positive test. Given the large positive LR and the high specificity, a positive test would rule in the condition. Conversely, the smaller sensitivity value and a negative LR closer to 1 indicates that a negative result of this test would not provide strong support for ruling out the condition.⁸⁻¹⁰

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Case Scenario 2

Sports clinical specialists should be knowledgeable in the rehabilitation of injuries suffered by athletes. Requisite knowledge to maximize the athlete's rehabilitation outcome includes an understanding of tissue healing, anatomy, biomechanics, pathomechanics, functional progression, and, when applicable, the influence of surgical intervention on the rehabilitation plan.

A 25-year-old woman who underwent right anterior cruciate ligament reconstruction (ACL) 6 weeks ago using a bone-tendon-bone patellar tendon graft is referred to physical therapy. She injured her right knee 3 months ago while downhill skiing. Examination shows a quadriceps avoidance gait pattern during ambulation on the floor and stairs. Active range of motion (AROM) in the right knee is 2°, 0°, and 130° and in the left knee is 8°, 0°, and 146°. Muscle recruitment in the quadriceps is good on the right, with visible definition and no extension lag. The athlete participated in tennis, volleyball, softball, and cycling before undergoing this surgery.

Rehabilitation/Return to Activity

Question 1 for Case Scenario 2

Given the examination data, which of the following activities would be most effective to reestablish a normal gait pattern?

- a) Sitting resisted knee extension from 90° to 45°
- b) Double-leg mini squat
- c) Bilateral leg press
- d) 4-inch lateral step-up

The correct answer is **d**.

While quadriceps strengthening activities are certainly indicated, the patient's AROM and lack of extension lag indicates that the strength of the quadriceps is adequate to ambulate with a normal gait pattern. The 4-inch lateral step-up would be the best activity of those listed to provide the neuromuscular training needed to restore a normal gait pattern.^{1,2} The quadriceps avoidance gait pattern happens primarily during the midstance phase of gait. During this protective phase of healing, weight-bearing exercises offer minimal to no ACL tensile stress.² Functionally, the step-up activity is the only activity listed that is performed in unilateral stance through the range of motion and muscular sequencing closely approximating that during midstance of gait.

Question 2 for Case Scenario 2

Results from which of the following tests performed 12 weeks after surgery would offer the most functionally useful information in determining if the athlete is able to progress to a jogging program?

- Isokinetic torque testing
- Knee arthrometer
- Single-leg press, 10-repetition maximum
- Single-leg hop for distance

The correct answer is **d**.

Significant deficits in any of the 4 options listed would indicate that the athlete would probably not tolerate the initiation of a jogging progression program. However, in consideration of the biomechanics of running and the requirement for single-leg loading and unloading, d is the best answer. Options **a** through **c** are performed under very protected conditions and may show minimal to no deficit while the athlete still may have difficulty jogging. Option **b** is a static measurement and is not a measure of readiness for dynamic single-leg loading. The single-leg hop for distance is the test most similar to jogging in this group. To be successful, the athlete has to be able to sequentially load, unload, and then load the lower extremity effectively for successful performance of the test. In isolation, the athlete's performance on this test would better predict her ability to make the more complex adjustments required when jogging.^{1,3,4,6,8}

Injury Prevention

Question 3 for Case Scenario 2

Which of the following is a landing technique that is more frequently observed in female athletes than in male athletes and predisposes female athletes to greater risk than the male athletes of ACL injury?

- Greater valgus moment with greater knee extension
- Less varus moment with greater knee extension
- Less valgus moment with greater knee flexion
- Greater varus moment with greater knee flexion

The correct answer is **a**.

Females tend to land with the knee in more extension and with greater perturbations in the frontal plane.^{5,6,7} Using this landing strategy, they also are more likely to have greater quadriceps activation and less hamstring activation than their male counterparts.⁶ Landing with the knee in greater extension, with higher quadriceps activation, and with less hamstring recruitment causes an increase in the anterior shear forces in the knee. The addition of varus/valgus moments during the landing further increases the loads on the ACL.^{5,6,7,9}

Medical/Surgical Considerations

Question 4 for Case Scenario 2

In the case of ACL reconstruction with a patellar tendon-bone-tendon graft and interference screw fixation, the most likely location of graft failure at 15 weeks would be which of the following?

- Bone plug in the femoral tunnel
- Bone plug in the tibial tunnel
- Bone-tendon interface
- Midsubstance of the graft

The correct answer is **d**.

Failure at the bone interfaces would be highly unlikely by 15 weeks, given that normal healing time for bone is around 6 to 8 weeks.¹⁰ By 15 weeks the "ligamentization" process of the graft would make failure in the midsubstance to be the most likely site of the options listed.^{10,11,12,14}

Professional Roles and Responsibilities

Question 5 for Case Scenario 2

An athlete who is to undergo ACL reconstruction asks the sports clinical specialist about the difference in outcomes of the surgery when using a hamstring autograft, a patellar tendon autograft, or a patellar tendon allograft. Which of the following levels of evidence should the sports clinical specialist offer as the greatest strength regarding the influence of graft choice on outcome?

- Clinical experience
- Randomized clinical trials
- Observational studies
- Case studies

The correct answer is **b**.

Physical therapists with a specialty in sports need to be able to sift through the volumes of information available to be able to determine and develop rehabilitation programs that will maximize patient/client outcome. The physical therapist also must be able to help patients interpret the available information. Of the options listed above, the randomized clinical trial produces the strongest evidence for cause and effect relationships.⁹

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Case Scenario 3

Physical therapists with a specialty in sports should have knowledge of medical conditions affecting an athlete's ability to train and compete. Individuals with such conditions should be referred to appropriate health care providers for necessary medical testing and intervention.

Medical/Surgical Considerations

Question 1 for Case Scenario 3

During the first 4 weeks of the track season, a 14-year-old male cross-country runner has a persistent cough during and continues after training outdoors. He says that he rarely coughs when he is not training. Which of the following is the most likely cause of this cough?

- a) Bronchospasm
- b) Acute bronchitis
- c) Vocal cord dysfunction
- d) Allergic rhinitis

The correct answer is **a**.

Asthma is a chronic lung condition affecting more than 7% of the US adult population (20 million people), and its prevalence has been increasing over the past 2 decades.^{6,7} Competitive athletes have a higher prevalence of exercise-induced asthma (bronchospasm) than the general population.^{5,13} Research has shown the prevalence of asthma among US Olympic team members to be

16.7% in the 1996 Summer Games¹⁹ and 22.4% in the 1998 Winter Games.²⁰ Uncontrolled asthma not only interferes with athletic performance, it is also potentially fatal, with more than 4,000 deaths related to asthma in 2000.⁷

One of the most common symptoms of athletes with asthma is a persistent cough.^{1,15,17} An athlete who frequently coughs during and after exercise is likely to be experiencing exercise-related bronchospasm. Given that his symptoms are associated only with exercise, it is highly unlikely that he would have an infectious condition (acute bronchitis) or an allergic condition (allergic rhinitis). Vocal cord dysfunction (VCD) results in shortness of breath of varying intensity, wheezing, stridor, choking, throat tightness, voice changes, and sometimes cough.² However these symptoms often resolve quickly after relaxation or cessation of activity.²

Question 2 for Case Scenario 3

This athlete is diagnosed by his primary physician with moderate persistent asthma. He is given an inhaled corticosteroid, an albuterol inhaler, and an oral leukotriene antagonist medication. Which of the following programs of usage is likely to be most effective in relieving this patient's symptoms?

- a) Inhaled corticosteroid as needed and the albuterol inhaler and leukotriene antagonist medication daily
- b) Leukotriene antagonist medication and albuterol inhaler as needed and the corticosteroid daily
- c) Corticosteroid and leukotriene antagonist medication daily and the albuterol inhaler as needed
- d) Albuterol inhaler 3 times a day and the leukotriene antagonist medication and corticosteroid as needed

The correct answer is **c**.

The pharmacologic management of asthma is the responsibility of a physician. However, a sports clinical specialist should be familiar with the dosage schedule of common asthma medications in case an athlete has an asthma emergency. The leukotriene antagonist medications, such as montelukast and zafirlukast, are to be used daily for inflammatory control and are not to be used as emergency medications.¹² Likewise, inhaled corticosteroids are not to be used for symptom relief. The short acting beta₂-agonists such as albuterol are intended for use based on symptoms.^{9-11,16}

Acute Injury/Illness Management

Question 3 for Case Scenario 3

During a meet later in the season, the athlete collapses as he crosses the finish line. He is in respiratory distress, talking in short phrases or single words, and using accessory respiratory muscles for breathing. In addition to activating EMS, which of the following is the most appropriate initial action by the sports clinical specialist?

- Ask him to stand and put his hands over his head and walk.
- Advise him to take a dose of his albuterol inhaler.
- Ask him to sit and slowly breathe into a paper bag.
- Administer an anti-inflammatory medicine.

The correct answer is **b**.

If an athlete has an emergency asthma situation, the sports clinical specialist needs to know the appropriate management of this situation. For an acute exacerbation of asthma, the evidence-based clinical guideline is to immediately provide a short-acting beta₂-agonist.^{8,14} Attempting to have the athlete self-control his breathing is unlikely to resolve an acute episode and may, in fact, result in a worsening of the breathing distress. Although an anti-inflammatory medicine may be beneficial for treating fever and pain associated with an acute asthma exacerbation, it is not recommended for management of acute respiratory distress.

Injury Prevention

Question 4 for Case Scenario 3

Which of the following activities is **least** likely to trigger an asthmatic event in this athlete?

- High-altitude climbing
- Running in an industrial urban environment during hot weather
- Rollerblading along a beach path
- Ice-skating in an indoor rink

The correct answer is **c**.

Exercise-induced asthma is bronchospasm induced by exercise, but the severity of airway occlusion is related to the temperature and humidity of the inspired air and the presence of airborne allergens or pollutants.^{5,15-18} Cold, dry air tends to trigger an asthmatic event, and, as such, high-altitude mountain climbing is a higher-risk activity.⁵ Running in an urban industrial environment is also high risk given the concentrations of airborne pollutants during the summer. Likewise, skating in an indoor rink involves exposure to colder air and pollutants from ice-grooming machinery. Therefore, of the choices listed, rollerblading in a warm, humid environment would be the lowest risk activity.

Question 5 for Case Scenario 3

An athlete who has asthma should be encouraged to self-monitor the condition by routine assessment of lung function using a:

- Peak flow meter
- Pulse oximeter
- Sphygmomanometer
- Spirometer

The correct answer is **a**.

Self-monitoring by the athlete is essential to identify asthma triggers and the effectiveness of medications. The current recommendations for self-monitoring involve the use of a peak flow meter forced expiratory volume in one second (FEV₁).^{3-4,11} This simple, inexpensive device provides information regarding the velocity of exhaled air. The athlete can use these data to identify how severe an exacerbation is and what action to take. Although the spirometer provides important lung function data as well, it is not recommended for routine patient monitoring. Pulse oximeters and sphygmomanometers are not appropriate asthma monitoring devices.

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Case Scenario 4

A 25-year-old male sustained bilateral transfemoral amputations from a motorcycle accident 8 months ago. He is referred to sports physical therapy for advice and training because he wants to start running again. He is proficient with walking using his prostheses, but he has not tried running yet and is apprehensive. He completed his formal rehabilitation and has full strength in both hips and full hip range of motion in all directions. He does not complain of any pain.

Rehabilitation and Return to Activity

Question 1 for Case Scenario 4

Before this athlete begins a running program, the sports clinical specialist should recommend which of the following studies?

- a. Bone-density
- b. MRI
- c. Radiograph
- d. Ultrasound

The answer is **a**.

A standard bone-density study is performed to ensure the patient is physically capable of participating without risk of stress fracture as a routine precaution after relative inactivity.

Question 2 for Case Scenario 4

The athlete's study results are normal. The physical therapist now recommends an appointment with his prosthetist to request what type of prosthetic knee for initial training?

- a. Mechanical
- b. Microprocessor
- c. Nonarticulated
- d. Powered

The correct answer is **c**.

Given the stability issues associated with running on an articulated transfemoral prosthesis, it is often recommended to begin with a nonarticulated model. This starting point allows the patient to build confidence and conditioning with a reduced risk of falling due to inadvertent knee flexion.

Question 3 for Case Scenario 4

What type of gait pattern will this patient most likely display when running with these prostheses?

- a. Circumducted
- b. Forefoot
- c. Heel-Toe
- d. Trendelenburg

The correct answer is **a**.

Transfemoral amputees often find that they run better in a nonarticulated prosthesis, using a circumducted gait pattern. Running is a frequently requested activity by young adults with amputations. Physical therapists with a specialty in sports should be knowledgeable in how to adapt/adjust sports participation based on disability considerations, including prosthetic use.

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Case Scenario 5

A 19-year-old college female basketball player complains of left shoulder pain of moderate intensity that has been present for approximately 2 weeks. She reports that the left shoulder pain worsened over the first week and then plateaued over the second week. No identifiable trauma was noted. When asked about her past medical history, she reports that she developed mononucleosis approximately 3-4 weeks ago but now feels much better. She states that she would like to return to basketball practice as soon as possible. The physical examination was unremarkable. Active and passive left shoulder range of motion was within normal limits without causing increased pain.

Medical/Surgical Conditions

Question 1 for Case Scenario 5

What is the most likely reason for the athlete's left shoulder pain?

- a) Apical lung mass
- b) Cervical radiculopathy
- c) Hepatomegaly
- d) Splenomegaly

The answer is **d**.

The only contributing factor appears to be infectious mononucleosis (IM). Splenomegaly (ie, enlargement of the spleen) is a possible side effect of IM and usually occurs 2-3 weeks after the

initial onset of symptoms. The enlarged spleen may put direct pressure on left side of the central diaphragm and elicit left shoulder pain via the phrenic nerve (C3-5); this is known as the Kehr's sign. Note: Physical examination techniques have poor sensitivity and specificity in identifying splenomegaly. Interrater reliability for physical examination is also poor.

Question 2 for Case Scenario 5

The sports clinical specialist should recommend which of the following imaging studies to confirm the origin of the athlete's left shoulder pain?

- a) Bone scan
- b) MRI
- c) Radiograph
- d) Ultrasound

The correct answer is **d**.

One-time imaging is generally not recommended due to wide variability in normal values, but if imaging is obtained to evaluate splenic size, ultrasound is preferable in that it is easy, noninvasive, and reliable and does not expose the patient to radiation. Imaging should be considered if splenic injury, either traumatic or spontaneous, is suspected or when the athlete with acute IM is clinically asymptomatic early on in recovery and early return to activity is contemplated. In the latter case, serial imaging should be considered to take into account the wide variability in splenic size. Note: If imaging is obtained to exclude splenic injury or rupture, CT is recommended given the increased amount of information provided.

Question 3 for Case Scenario 5:

One week later, the athlete no longer has any shoulder pain, and follow-up serial imaging is normal. She also reports/exhibits a normal energy level. When can the athlete resume basketball?

- a) Immediately
- b) When maximal aerobic capacity is 95% of pre-illness
- c) 3 months from onset of symptoms
- d) 2 months from resolution of symptoms

The correct answer is **a**.

It is generally felt that it is safe to resume light activity 3 weeks from the onset of symptoms (since the vast majority of splenic ruptures occur between 4 and 21 days of illness) as long as the athlete is afebrile, has a good energy level, and does not have any significant associated abnormalities. Regarding contact sports, a time frame of at least 3 weeks is also commonly recommended if the athlete has no remaining clinical symptoms, is afebrile, and has a normal energy level.

Infectious mononucleosis, caused by the Epstein-Barr virus, primarily affects adolescents and young adults. Up to 50% of college freshman are susceptible to the disease, and 1%-3% of them develop "the kissing disease" annually. Physical therapists with a specialty in sports should be knowledgeable regarding IM presentation, examination, and return-to-sport criteria for individuals with this condition.

References

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Case Scenario 6

Sports Performance Enhancement

For an athlete who is planning to have 1-2 days of rest between intense middle-distance track training sessions, what recommendation should be provided regarding nutrient timing following the workout to ensure glycogen replenishment?

- a) Carbohydrate intake of 1.2-1.4 g/kg of bodyweight, immediately following the training session.
- b) Mixed carbohydrate (1.2-1.4 g/kg of bodyweight) and protein intake (1.0-1.5 g/kg of bodyweight) within 30-60 minutes of completing the training session.
- c) Mixed carbohydrate (1.2-1.4 g/kg of bodyweight) and protein intake (1.5-2.0 g/kg of bodyweight) within 2-4 hours of completing the training session.
- d) Carbohydrate intake of 1.2-1.4 g/kg of bodyweight, within 24 hours after the training session.

The correct answer is **d**.

It is unnecessary for athletes who rest 1 or more days between intense training sessions to practice nutrient timing about glycogen replenishment as long as sufficient carbohydrates are consumed during the 24-hr period following the training session.

References

1. Rodriguez NR, DiMarco NM, Langley S. Nutrition and Athletic Performance. Joint Position Statement from the American College of Sports Medicine, the American Dietetic Association, and Dietitians of Canada. *Med Sci Sport Ex*. 2009:709-731.
2. Zoorob R, et al. Sports nutrition needs: before, during, and after exercise. *Prim Care Clin Office Pract*. 2013;40:475-486.

Case Scenario 7

Sports Performance Enhancement

Intake of carbohydrates and protein within 30 minutes following a workout is most important for which of the following athletes?

- a) Power lifter who has completed a leg work out today and is planning to do a chest and back workout tomorrow.
- b) Triathlete participating in a 1-mile swim in the morning and planning to do a 2-hour bike ride 9 hours later.
- c) Swimmer who has completed a 5,000-meter training session and will have the next workout in 2 days.
- d) Wrestler who is 160 pounds, at 9% body fat, and is trying to lose 2 pounds prior to a dual meet in 3 days.

The correct answer is **b**.

Due to the short inter-workout timeframe and relatively long-duration training sessions it is best to consume carbohydrates within 30 minutes after exercise to maximize recovery and readiness for the next training session. Nutrition advice for the wrestler should revolve more around total caloric intake and less around nutrient timing.

References

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Chapter 4: Examination Content

The board-certified sports physical therapy specialist examination is based on 6 major competency areas. Each competency area was subdivided into specific objectives in Chapter 2. The percentage of the exam devoted to each of these areas is outlined below. These percentages were based on a survey of APTA's Sports Physical

Therapy Section and on the opinions of a group of subject matter experts. Each question in the item bank is categorized according to the competency area, and when the test is constructed the question distribution on the exam approximately reflects these percentages.

Category	% of Exam	Approximate # of Questions
I. Rehabilitation and Return to Sports:		
A. Examination, Evaluation, and Diagnosis	20%	40
B. Prognosis, Interventions, and Outcomes	20%	40
II. Acute Injury/Illness Management	15%	30
III Medical/Surgical Conditions	15%	30
IV. Injury Prevention	15%	30
IV. Sports Performance Enhancement	10%	20
VI. Professional Roles and Responsibilities	5%	10
	100%	200

Chapter 5: Executive Summary

Introduction

A practice analysis is a systematic study of professional practice behaviors and content knowledge that compose specialty practice. The purpose of a practice analysis is to collect data that describes the requisite knowledge and skills of the board-certified sports clinical specialist and the characteristics of contemporary specialty practice in sports physical therapy. From analysis of these data, the *Description of Specialty Practice* (DSP) is reviewed and revised to describe the current knowledge base and competency areas for sports physical therapy practice. The DSP then sets the blueprint for the specialist certification examination to identify the physical therapists who are capable of advanced practice in this specialty area. This chapter summarizes the practice analysis research for clinical specialization in sports physical therapy that resulted in the generation of this DSP.

Methods

Survey Instrument

Members of the Specialty Council on Sports Physical Therapy met in 2010 to develop the survey instrument in collaboration with the sports subject matter experts (SME) group and their consultant. Contributing documents included the *Guide to Physical Therapist Practice*¹ and its patient/client management model, the survey used by the Specialty Council on Pediatric Physical Therapy, and the existing 2002 *Sports Physical Therapy Description of Specialty Practice*.² The survey consisted of 5 sections: (1) knowledge areas; (2) other professional roles, responsibilities, and values; (3) patient/client management model; (4) percentile classification of body regions treated; and (5) demographic information. For the knowledge area in section 1 of the survey, the participants were asked to rate how frequently a sports clinical specialist would use this knowledge area, how important that knowledge area is to practice as a sports clinical specialist, and, finally, the level of judgment a sports clinical specialist exercises when using this knowledge area. For all items in sections 2 and 3, the participants were asked to rate the frequency and importance as in section 1, and to rate the level of mastery a sports clinical specialist would demonstrate while performing the skill. The survey design included a 5-point rating scale for frequency of use (never, less than once a month, monthly, weekly, daily), a 4-point rating scale for importance (not important, minimally important, moderately important, very important), and a 4-point rating scale for level of judgment (not used, recall, application, analysis) for section 1 and level of mastery (advanced beginner, competent, proficient, expert) for sections 2 and 3.

Pilot Survey

A pilot survey was conducted during the summer of 2011. The purposes of the pilot survey were to test the survey instrument, clarify current competencies in the practice of sports physical therapy, identify potential new competencies, and provide data to confirm the final practice analysis survey. The pilot survey was distributed to 30 board-certified sports clinical specialists selected by the SME group. Input from the pilot study respondents was used to make grammatical corrections and clarify survey item examples. Based on the consistent feedback from the pilot volunteers regarding the length of the survey, the Sports Physical Therapy Council and consultant proposed that the formal survey would allow respondents the option of completing only 1 of the 3 randomly assigned sections of knowledge, additional roles, and patient/client management. All respondents were requested to provide information on the percentage of body regions treated and demographics. This new policy ultimately led to 4 groups of respondents: a group that opted to answer the entire survey; a group that answered Sections 1 and 2; a group that answered Section 3 on patient/client examination, evaluation, diagnosis, and prognosis; and a final group that responded to items regarding patient/client interventions and outcomes in Section 3. Within these respective groups, not all respondents answered all items within the section.

Final Survey Administration

In July 2102, the survey invitation was e-mailed to all 930 current board-certified sports clinical specialists and 850 randomly selected nonspecialists who were members of the Sports Physical Therapy Section. The survey was accompanied by a cover letter providing instructions and an internet link to participate in the survey. Several additional calls for participants with e-mail reminders were sent out at 4, 8, and 10 weeks later to nonrespondents. The survey was closed to additional data collection when the response to the repeated reminders was unproductive in recruiting new respondents. Respondents were given the opportunity to call or e-mail the project coordinator if they had questions about the survey. The majority of the questions posed by the respondents involved their eligibility to complete the survey, ie, not working in sports practice. Several respondents also had questions about the rating scales and the differentiation between importance and level of judgment or mastery scales.

Data Analysis

Participant demographics were summarized using frequency charts presented in Chapter 1. This information included age, sex, ethnicity, geographic region, educational and residency training background, professional experience, certification status, employment setting, clinical responsibility, and productivity.

Standard descriptive statistics (frequency tables, means, medians, and quartiles) were obtained for all variables in Sections 1,

2, and 3. Section 1 of the survey had 42 items measured on 3 different scales (frequency, importance, and judgment) giving a total of 126 data points. Section 2 of the survey had 18 items measured on 3 different scales (frequency, importance, and mastery) for a total of 54 data points. Finally, Section 3 of the survey had 97 items measured on 3 different scales (frequency, importance, and mastery) for a total of 291 data points. Because the entire survey had 471 data points, it was decided that for the SME panel to effectively interpret the results, the data needed to be collapsed into a more manageable set of data points. The selected method was to add the results from the importance and level of judgment scales for Section 1 and add the results from the importance and level of mastery scales for Sections 2 and 3. Previous experience suggests that these constructs (importance and judgment, importance and mastery) usually are significantly correlated. The results of Spearman's correlation analyses on this data set supported this supposition. Never was an item rated high on the importance scale and low on the judgment/mastery scales or vice versa. Utilization of this methodological approach reduced the number of data points in Section 1 to 42, in Section 2 to 18, and in Section 3 to 97. Frequency data was not included in the data collapse because it was recognized that there could be critical components of the practice of sports physical therapy that only rarely occur (emergency management of significant cervical spine injuries). As such, the frequency results were available to the SME panel to inform discussion of items, but the combined importance and judgment/mastery scores were the primary results used to determine inclusion of an item in the description of specialty practice.

Following this data collapse, descriptive statistics were obtained for each the combined importance and judgment/mastery items. The combined items within each section were then ranked in descending order based on the median score using the mean score to break ties. To facilitate review and discussion, the ranked item list for each section was subdivided into quartiles. In April 2013, these data were distributed to the Specialty Council, the SME group, and the consultant, followed by a meeting to review and discuss the survey findings.

Consensus building determined the final competencies that describe sports physical therapy specialty practice. The decision rule process was discussed at length. Items ranking in the bottom quartile or below the collective value of moderately important, proficient mastery, and application-level judgment were reviewed by the consultant, members of the specialty council, and the SME group to determine their inclusion or exclusion in the final draft of the description of specialty practice. The participants reached 100% consensus on all items brought up for discussion. Additionally, responses from sports clinical specialists compared with noncertified specialists were reviewed. The rationale for not including a competency item in the new DSP was: (1) the competency median for Section 1 was below the moderately important level and application level of judgment, or for Sections 2 and 3 it

was below the moderately important level and proficient mastery level; (2) the competency was considered to be an entry-level expectation; or (3) the competency did not differentiate between specialists and nonspecialists.

The survey respondents' recommended examination blueprint data was reviewed along with the existing 1994 and 2002 blueprint information and the frequency data supplied in the current survey. The SME group discussed the examination breakdown and came to consensus about the weighting and distribution of items based upon this information. The consensus decision regarding the breakdown of material for the examination is presented in Chapter 4.

Results

Survey results from all mailings were combined for statistical analysis. A total of 414 respondents completed at least some portion of the survey (23% response rate). 259 of the respondents indicated they were board-certified clinical specialists in sports physical therapy, 120 failed to indicate their board certification status, and 35 reported they were not board certified in sports physical therapy.

Data from the first 4 sections of the survey are the basis for the description of specialty practice in sports in Chapter 2. According to the decision rules agreed upon, no items were eliminated from Sections 1 or 3 of the survey. One item was eliminated from Section 2 because it did not meet at least 1 of preselected criteria set forth by the SME group.

Using the *Guide to Physical Therapist Practice*,¹ competencies from the 2002 DSP,² the survey results, and SME consensus opinion, the sports clinical specialist competencies were reorganized and rewritten as 6 competency categories. Practice knowledge and skills from the survey were reviewed by the SME group and recategorized using the new competency categories. Most survey items were retained in the DSP; the decision to delete items was based on the combination of the survey data and the expert opinion of the SME group. In this process, the SME group considered aspects of practice that are important today and those that were projected to be of increasing importance in the next decade.

The examination blueprint was revised from the 2002 DSP based on the survey results and the SME consensus opinion. For the next 10-year cycle, 40% of the examination will be based on the patient management model as applicable to the examination, rehabilitation, and return to activity of athletes (20% on examination, evaluation, and diagnosis and 20% on prognosis, intervention, and outcomes). Acute injury and illness management, medical/surgical conditions, and injury will each constitute 15% of the examination. Sports performance enhancement will constitute 10% of the examination, and the final 5% of the examination concerns professional roles and responsibilities.

To illustrate the link between foundational knowledge and the practice competencies, the DSP provides case scenarios. Three new case scenarios were added to the existing three case scenarios, providing 25 test item examples to further illustrate the breadth and depth of the examination expectations. These cases were prepared based on contemporary information and using principles of evidenced-based practice. They are intended to help candidates prepare for the examination by presenting examples of question types in different competency areas.

Conclusions

The demographic information in Chapter 1 is the most current data on board-certified clinical sports specialists. The DSP for sports physical therapy in Chapter 2 is based on the patient/client management model in the *Guide to Physical Therapist Practice*¹ with emphasis on the professional practice expectations, tests and measures, and intervention skills that distinguish a sports clinical specialist from a nonspecialist. This description of practice was validated through a survey of sports clinical specialists. Chapter 2 also can serve future sports specialists as a self-assessment tool from which to develop a study guide to prepare for the certification examination. Chapter 2 also describes the foundation knowledge-base areas pertinent to sports physical therapy practice in the development of residency education in this specific discipline of physical therapy. The case scenarios in Chapter 3 are presented to demonstrate the links between the practice expectation competencies and their associated knowledge areas, and to familiarize future sports clinical specialists with the certification examination question format. Chapter 4 presents the examination content outline, and Chapter 5 presents the technical data regarding the practice analysis and the development of the DSP. This is a working document and will continue to be revisited on a recurring basis for review and revalidation based on changes in practice over time.

References

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