

**Health and Physical Education****ANATOMY AND SPORTS INJURY
PE 7800 – One Credit, One Year**

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

This course will focus on basic anatomy (bones, muscles, ligaments, blood, and nerve supply) and recognition, treatment, and rehabilitation of injuries to the upper and lower body. Students will acquire an understanding of basic medical concepts and healing processes. Treatment principles and techniques for acute and chronic injuries will also be covered. Laboratory sessions are included for taping and wrapping techniques. Enrollment is based on recognized interest in sports medicine or other allied health fields and requires the instructor's approval.

PREREQUISITE

Biology

Open to students in grades 10-12.

REQUIRED STUDENT TEXTBOOK

Sports Injury Management, Lippincott, (2000)

GOALS

The Anatomy and Sports Injury course of study will assist each student in

- developing a foundation of concepts for understanding the characteristics and functions of anatomical structures;
- developing investigative skills in order to delineate injuries, including interpreting data, drawing conclusions, and conducting investigations of injuries;
- applying the processes of logical thinking to make responsible decisions about appropriate treatment of injuries;
- understanding the place of sports medicine in all areas of health related careers.

STUDENT REQUIREMENTS

- Demonstrate knowledge and understanding of the objectives.
- Participate in the laboratory experiences.
- Use library skills to prepare written and oral reports.
- Research an issue of controversy in the area of sports injury.
- Read current literature on topics relevant to classroom experiences.
- Investigate career opportunities in the area of sports medicine.

LABORATORY EXPERIENCES

Laboratory experiences will be conducted for each of the joint areas identified. These labs will include location of the injured site, evaluation and testing, and wrapping/taping practice.

COURSE OBJECTIVES

The Anatomy and Sports Injury course has sixteen units including the introduction. Each unit contains objectives, laboratory experiences, and textbook references.

1.0 The student will examine the foundations of sports medicine.

- 1.1 Define sports medicine.
- 1.2 Identify members of the primary sports medicine team and describe their roles and responsibilities in sports injury management.
- 1.3 Explain the parameters of ethical conduct and certification standards of professional practice for athletic trainers.
- 1.4 Specify academic and clinical requirements necessary to become a NATABOC Certified Athletic Trainer and the requirements to obtain licensure as an Athletic Trainer in the Commonwealth of Virginia.
- 1.5 Describe potential job opportunities for an individual interested within the health sciences field.
- 1.6 Explain standard of care and what factors must be proven to show legal breach of that duty of care.

LAB EXPERIENCE AND ACTIVITIES:

- 1a: Conduct five hours of observation outside of home school within the allied health professions aligned with athletic training, and create a writing assignment at the discretion of the teacher. The assignment may be a journal with a time log or a paper describing the observation experience.*
- 1b: Create a record keeping system and inventory for an athletic training program.*
- 1c: Create a PowerPoint project or poster presentation describing a career within the health sciences field.*
- 1d: Guest speakers, including professionals within the sports medicine field, present information to the students.*

2.0 The student will examine the anatomy and physiology of the body as applied to sports medicine.

- 2.1 Locate and identify major skeletal anatomy.
- 2.2 Utilize correct medical terminology to identify anatomical regions and planes, body position, and motion.
- 2.3 Utilize the correct medical terminology for joint identification and components of joints, including ligaments, cartilage, bursa, tendons and capsule.

LAB EXPERIENCE AND ACTIVITIES:

- 2a: Create a medical terminology worksheet, including Latin suffix, prefix and roots.*
- 2b: Identify the major bones of the skeleton and integrating medical terminology using x-rays and a disarticulated skeleton.*
- 2c: Place a bone from the disarticulated skeleton in a bag so that the bone cannot be seen. Have students reach into the bag without looking and attempt to identify which bone is in the bag by touch only.*
- 2d: Identify pictures of bones as put into a PowerPoint project by the teacher.*
- 2e: Analyze the movements of the body by performing an analysis of motions of major joints as associated with a sport-specific action or motion.*
- 2f: Dissect a raw chicken wing to identify ligaments, cartilage, muscles, bones, joint types, tendons, joint capsule, vascular structure, skin and fat.*

3.0 The student will analyze the sports injury assessment process.

- 3.1 Differentiate between the hops injury assessment format and the Subjective, Objective, Action Plan (SOAP) note format used to assess and manage a sports-related injury.
- 3.2 Explain the general components that comprise a complete history of an athletic-related injury or illness.
- 3.3 Differentiate between visual observation and inspection at the primary injury site.
- 3.4 Describe and demonstrate various tests included in the physical examination of an injury.
- 3.5 Develop a general emergency action plan for an athletic setting, specifically related to the home school facility.
- 3.6 Identify the responsibilities of each member of the on-site sports medicine team in providing emergency care at an athletic event.
- 3.7 Identify emergency conditions that warrant immediate activation of the Emergency Medical Services (EMS) system.
- 3.8 List supplies and emergency equipment that should be present at an athletic event.
- 3.9 Explain the procedures used in an “on-the-field” sports injury assessment.
- 3.10 Demonstrate proper procedures for transporting an injured individual.
- 3.11 Describe testing techniques used by medical specialists to make an accurate diagnosis.

LAB EXPERIENCES AND ACTIVITIES:

- 3a: *Utilize appropriate materials and splinting techniques to immobilize various injuries and practice transporting injured athletes.*
- 3b: *Role-play athletic injuries and have students utilize appropriate medical supplies and equipment needed to treat the injury.*
- 3c: *Demonstrate a primary and secondary survey of basic athletic injuries.*
- 3d: *Learn proper procedures for and practice assessment of blood pressure, pulse, respiration and pupil response as associated with injury assessment.*

4.0 The student will examine the relationships among the components of treatment, cause of injury, musculo-skeletal structures and the healing process.

- 4.1 Differentiate among compression, tension, shear, stress, strain, bending and torsion forces, as related to soft-tissue and bony injury.
- 4.2 Identify the components of long bones and soft tissues.
- 4.3 List and describe common soft tissue and bony injuries.
- 4.4 Describe the processes by which soft tissue and bony tissue healing occurs.
- 4.5 Explain wound care for both superficial and deep soft-tissue and bone injuries using universal precautions.
- 4.6 Explain the mechanisms by which nerves are injured and the processes by which nerves can heal.
- 4.7 Describe the neurological basis of pain and identify factors that mediate pain.

LAB EXPERIENCES AND ACTIVITIES:

- 4a: *Differentiate among fracture types using x-ray films.*

- 4b: *Simulate application of proper techniques for wound care using universal precautions.*
- 4c: *Identify internal components of a long bone using a cow bone obtained from a local butcher.*

5.0 The student will analyze the modalities used in the treatment of sports injuries.

- 5.1 Describe the methods of applications and physiological effects of cryotherapy and thermotherapy.
- 5.2 Describe the principles behind ultrasound by explaining the physiological effects and mode of application.
- 5.3 Explain the various types of electrical stimulating units and application of each.
- 5.4 Describe the benefits attained in each of the five basic massage strokes and explain their application.
- 5.5 Categorize therapeutic medications used to promote healing.

LAB EXPERIENCES AND ACTIVITIES:

- 5a: *Demonstrate the use of common modalities used in the treatment of injuries in the school athletic training room allowing students to experience the various modalities.*
- 5b: *Demonstrate the five basic massage strokes.*
- 5c: *Choose and identify appropriate modalities for specific injuries.*

6.0 The student will apply the principles of therapeutic exercise to specific sports injuries.

- 6.1 Explain the athletic trainer's role in dealing with the psychological influences on healing.
- 6.2 Explain the phases of a therapeutic exercise program, including the goals of these phases and methodology of implementation.
- Control of inflammation
 - Restoration of motion
 - Development of strength
 - Development of balance, proprioception and power
 - Return to pre-injury activity levels with sport-specific drills and activity

LAB EXPERIENCES AND ACTIVITIES:

- 6a: *Create a rehabilitation program for a specific injury.*
- 6b: *Demonstrate conditioning and rehabilitation exercises using weight training equipment.*
- 6c: *Demonstrate rehabilitation techniques such as Proprioceptive Neuromuscular Facilitation (PNF) stretching, restoration of range of motion and strength exercises.*
- 6d: *Demonstrate appropriate motions associated with major muscles.*

7.0 The student will examine the use of protective equipment as it relates to the prevention of sports injuries.

- 7.1 Describe the forces that produce focal and diffuse injuries.
- 7.2 Specify the principles used to design protective equipment and the agencies responsible for establishing material standards for protective devices.
- 7.3 Identify the different types of soft and hard materials used to make protective pads.
- 7.4 Explain the athletic trainer's legal duty of care in selecting and fitting protective equipment.
- 7.5 Describe what information should be documented to support the organization's legal duty to provide safe equipment.

LAB EXPERIENCES AND ACTIVITIES:

- 7a: Correctly select and fit equipment including, but not limited to helmets, mouth guards, shoulder pads, eye wear, and shin guards.*
- 7b: Wet Foot Lab: Students will wet foot and walk across material to demonstrate foot motion and gait.*
- 7c: Analyze gait and factors involved in the selection and fit of athletic shoes.*
- 7d: Utilize various padding substances to form appropriate padding for specific injuries.*

8.0 The student will examine the injuries associated with the lower leg, foot and ankle.

- 8.1 Identify the important bony and soft tissue structures of the lower leg, ankle and foot.
- 8.2 Explain the function of the plantar arches and their role in supporting and distributing body weight.
- 8.3 Describe the motions of the foot and ankle, and identify the muscles that produce these motions.
- 8.4 Explain the mechanisms responsible for injury to the lower leg, ankle and foot.
- 8.5 List basic principles in the prevention of injuries to the lower leg, ankle and foot.
- 8.6 List common toe and foot conditions and describe the management of these conditions.
- 8.7 Differentiate among Grade 1, 2, and 3 ankle sprains and describe the management of each type of injury.
- 8.8 Identify common sites for tendon injuries and describe their management.
- 8.9 List the signs, symptoms and treatments associated with common overuse injuries of the lower leg, ankle and foot.
- 8.10 Describe the common vascular and neural disorders that may occur in the lower leg, ankle and foot.
- 8.11 Explain the management of fractures in the lower leg, ankle and foot.
- 8.12 Explain and demonstrate a thorough assessment of the lower leg, ankle and foot.
- 8.13 Describe general rehabilitation exercises for the lower leg, ankle and foot.

LAB EXPERIENCE AND ACTIVITIES:

- 8a: *Palpate and identify surface anatomy for the foot, ankle and lower leg.*
- 8b: *Demonstrate evaluation techniques for ankle and lower leg injuries.*
- 8c: *Demonstrate taping procedures for common injuries of the foot, ankle and lower leg.*
- 8d: *Identify bony anatomy of the foot, lower leg and ankle as found on x-ray films.*

9.0 The student will examine the injuries associated with the knee and upper leg.

- 9.1 Identify the important bony and soft tissue structures of the knee region.
- 9.2 Describe the motions of the knee, and the muscles associated with the motions.
- 9.3 Explain the mechanisms associated with common knee injuries.
- 9.4 Explain the basic principles in the prevention of knee injuries.
- 9.5 Describe the causes and management of bursitis in the knee.
- 9.6 Identify the structures injured in each type of unidirectional and multidirectional instability, and describe their management.
- 9.7 List the signs and symptoms associated with meniscal tears.
- 9.8 List the various factors that can predispose an individual to patellofemoral pain.
- 9.9 Describe common patella injuries and their management.
- 9.10 List signs and symptoms of iliotibial band syndrome.
- 9.11 Differentiate between osteochondral fracture and osteochondritis dissecans.
- 9.12 Describe a thorough assessment of the knee and patellofemoral joint.
- 9.13 Explain the basic principles associated with rehabilitation of the knee.

LAB EXPERIENCE AND ACTIVITIES:

- 9a: *Palpate and identify surface anatomy for the knee and upper leg.*
- 9b: *Demonstrate evaluation techniques for the knee and upper leg.*
- 9c: *Demonstrate taping procedures for common injuries of the knee and upper leg.*
- 9d: *Identify and label bony anatomy and injuries associated with the knee and upper leg using x-ray films.*

10.0 The student will examine the injuries associated with the hip, pelvis and sacrum.

- 10.1 Identify the location and functions of the important bony and soft tissue structures of the pelvis, hip and thigh.
- 10.2 Identify the major nerves and blood vessels that course through the pelvic and proximal femoral region.
- 10.3 Describe the motions of the hip and identify the muscles producing these motions.
- 10.4 Explain the mechanisms responsible for common injuries of the pelvis, hip and thigh.
- 10.5 Identify specific measures that can prevent injury to the region.
- 10.6 Describe the signs and symptoms associated with a hip pointer and quadriceps contusion and explain what adverse conditions may result if the injury receives inadequate management.
- 10.7 Describe the three common sites for bursitis and explain the management of this condition.
- 10.8 List the signs and symptoms seen in first, second and third degree strains of the muscles that move the hip, and explain the management of each strain.

- 10.9 List the signs and symptoms of a hip joint sprain and describe the position and individual will likely be found in if the hip is dislocated.
- 10.10 List the characteristic signs and symptoms indicating a possible vascular or neural disorder in the pelvis, hip or thigh.
- 10.11 List and describe the various types of fractures that can occur in the pelvis, hip and thigh, and discuss the management of these fractures.
- 10.12 Describe a thorough assessment of the hip region.
- 10.13 Describe general rehabilitation exercises for the region.

LAB EXPERIENCES AND ACTIVITIES:

- 10a: Identify bony structures and injuries associated with the hip, pelvis and sacrum using x-ray films.*
- 10b: Palpate and identify surface anatomy for the hip, pelvis and sacrum.*
- 10d: Demonstrate injury assessment techniques for the hip, pelvis and sacrum.*
- 10e: Demonstrate wrapping procedures for common injuries of the hip and pelvis.*
- 10f: Assess for leg-length discrepancy and measure Q-angle in a partner.*

11.0 The student will examine the injuries associated with the hand and wrist.

- 11.1 Identify the important bony and soft tissue structures associated with the hand and wrist.
- 11.2 Describe the pathways of the median, ulnar and radial nerves, identifying the motor and sensory components of each nerve.
- 11.3 Describe the motions of the wrist and hand, identifying the muscles that produce the motions.
- 11.4 Explain the mechanisms associated with common injuries of the wrist and hand.
- 11.5 Describe measures that can be taken to prevent injuries to the wrist and hand.
- 11.6 Explain how to identify and manage general sprains and dislocations of the wrist and hand.
- 11.7 Explain how to identify and manage acute strains and tendinopathies of the wrist and hand.
- 11.8 Describe the more common nerve entrapment syndromes associated with the median, ulnar and radial nerves at the hand and wrist.
- 11.9 Explain the various types of fractures seen in the wrist and hand, and describe the management of these fractures.
- 11.10 Describe a thorough assessment of the wrist and hand.
- 11.11 Describe general rehabilitation exercises for the wrist and hand.

LAB EXPERIENCES AND ACTIVITIES:

- 11a: Palpate and identify surface anatomy for the hand and wrist.*
- 11b: Demonstrate injury assessment for the hand and wrist.*
- 11c: Demonstrate taping procedures for common injuries of the hand and wrist.*
- 11d: A timed manipulation of various small objects to demonstrate manual dexterity and fine motor control that can be lost in injury.*
- 11e: Create and label a detailed model of the hand using playdough clay.*
- 11f: Identify various bony structures and injuries associated with the hand and wrist using x-ray films.*

12.0 The student will examine the injuries associated with the upper arm, elbow and forearm.

- 12.1 Identify the important bony and soft tissue structures associated with the upper arm, elbow and forearm.
- 12.2 Describe the motions at the elbow, and identify the muscles producing these motions.
- 12.3 Explain the mechanisms responsible for common injuries in the upper arm, elbow, and forearm.
- 12.4 Describe measures used to prevent injuries in the upper arm, elbow and forearm.
- 12.5 List the signs and symptoms associated with a contusion to the region and explain what potentially serious conditions might develop if a contusion is improperly managed.
- 12.6 List the four types of bursae injuries or conditions associated with the upper arm, elbow, and forearm, and explain the management of each.
- 12.7 Explain the signs and symptoms associated with the different degrees of a joint sprain and muscle strains.
- 12.8 Explain the management of an elbow dislocation.
- 12.9 Contrast medial epicondylitis and common extensor tendonitis.
- 12.10 Name the three major peripheral nerves that course through the elbow region and describe the various differences in muscle weakness and sensory loss seen for each nerve if it is injured.
- 12.11 Describe the various types of fractures found at the elbow, and the management of these fractures.
- 12.12 Demonstrate a thorough assessment of the elbow region.
- 12.13 Demonstrate common rehabilitation exercises for the elbow.

LAB EXPERIENCES AND ACTIVITIES:

12a: Palpate and identify surface anatomy for the arm, elbow and forearm.

12b: Demonstrate injury assessment for the upper arm, elbow, and forearm.

12c: Demonstrate taping procedures for common injuries of the arm, elbow and forearm.

12d: Identify bony structures and injuries associated with the arm, elbow and forearm using x-ray films.

13.0 The student will examine injuries associated with the shoulder, upper back and chest.

- 13.1 Identify the important bony and soft tissue structures of the shoulder.
- 13.2 Describe the primary motions of the shoulder and identify the muscles associated with these motions.
- 13.3 Describe the phases of the throwing motion and list common injuries sustained during each phase.
- 13.4 Explain general principles and exercises used to prevent injuries to the shoulder.
- 13.5 List common mechanisms of injury that may lead to instability in the sternoclavicular joint, acromioclavicular joint and glenohumeral joint.
- 13.6 Explain the criteria for classifying acromioclavicular joint (AC) joint sprains.
- 13.7 Describe the primary anatomical restraints that prevent glenohumeral instabilities and explain the implications of injury to these structures relative to a possible dislocation or subluxation.

- 13.8 Define the various cartilaginous tears that may occur as a result of a glenohumeral dislocation and identify the locations of these tears.
- 13.9 Describe soft tissue pathology and management of the pathologies associated with overuse injuries of the shoulder.
- 13.10 Describe and demonstrate a thorough assessment of the shoulder region.
- 13.11 Explain general principles and techniques used in developing a rehabilitation exercise program for the shoulder complex.

LAB EXPERIENCES AND ACTIVITIES:

- 13a: Palpate and identify surface anatomy for the shoulder, upper back and chest.*
- 13b: Identify bony structures and various injuries associated with the shoulder, upper back and chest using X-ray films.*
- 13c: Demonstrate an injury assessment for the shoulder, upper back and chest.*
- 13d: Apply various shoulder wrapping techniques.*
- 13e: Identify various motions of the shoulder joint and the muscles associated with each motion.*

14.0 The student will examine the injuries associated with the spine.

- 14.1 Locate and explain the functional significance of the bony and soft tissues associated with the spine.
- 14.2 Describe the motion capabilities in the different regions of the spine.
- 14.3 Identify mechanisms and anatomical variations associated with spinal injuries.
- 14.4 Identify specific strategies in activities of daily living used to reduce spinal stress.
- 14.5 Explain measures used to prevent injury to the spinal region.
- 14.6 Describe common sports injuries and conditions associated with the spine and lower back region.
- 14.7 Describe and demonstrate a thorough assessment of the spine.
- 14.8 Identify rehabilitation exercises associated with the spinal region.

LAB EXPERIENCES AND ACTIVITIES:

- 14a: Palpate and identify surface anatomy of the spine.*
- 14b: Demonstrate an injury assessment of the spine.*
- 14c: Demonstrate and practice cervical spine injury transfer protocol.*
- 14d: Identify structures associated with the spine using X-ray films and MRI films.*
- 14e: Identify postural landmarks associated with the spine.*
- 14f: Perform the SCAN exam.*

15.0 The student will examine the injuries associated with the head and face.

- 15.1 Locate the important bony and soft tissues structures of the head and face.
- 15.2 Identify the forces responsible for cranial injuries.
- 15.3 Describe signs and symptoms associated with skull fractures.
- 15.4 Recognize the critical signs and symptoms that indicate a focal or diffuse cranial injury.
- 15.5 Explain the evaluation and management of a cranial injury.
- 15.6 Identify the signs and symptoms associated with a facial fracture.
- 15.7 Differentiate between and epistaxis and fractured nose.

- 15.8 Describe the differences in managing a loose tooth versus a fractured or dislocated tooth.
- 15.9 Recognized common external and internal ear conditions and explain their management.
- 15.10 Recognize the signs and symptoms associated with a serious eye injury.
- 15.11 Describe how to evaluate and manage an eye injury.

LAB EXPERIENCES AND ACTIVITIES:

- 15a: Conduct a side-line neurological examination.*
- 15b: Palpate and identify surface anatomy of the face and head.*
- 15c: Conduct baseline testing on each other to demonstrate the Balance Error Scoring System (BESS) of neurological testing used in contact/collision sports.*
- 15d: Perform brainteasers under different conditions (too hot, too cold, after intense burst of activity, etc) and compare to a baseline score on a brainteaser to demonstrate the conditions associated with a brain injury.*
- 15e: A guest speaker will do a presentation to explain the effects of brain injuries, both multiple minor injuries and major single incidents, upon the body.*

16.0 The student will examine the injuries associated with the trunk (chest, ribs, sternum and abdomen).

- 16.1 Identify the important bony and soft tissue structures of the throat, thorax and viscera.
- 16.2 Identify measures to prevent injuries to the throat, thorax and viscera.
- 16.3 Describe the signs, symptoms and appropriate management of superficial injuries of the throat, chest wall and abdomen.
- 16.4 Describe internal complications of the thoracic area that may occur spontaneously or as a result of direct trauma, and can lead to a life-threatening situation.
- 16.5 Describe the signs, symptoms and management of sternal and rib fractures.
- 16.6 Describe the signs, symptoms and management of inter-abdominal injuries.
- 16.7 Identify injuries, conditions and management of the genitalia related to sport participation.
- 16.8 Describe how to assess the throat, thorax and visceral regions.

LAB EXPERIENCES AND ACTIVITIES:

- 16a: Assess vital signs and associated measurements related to specific injuries of the trunk.*
- 16b: Draw a picture of the abdominal region identifying the four quadrants and organs found in each quadrant.*



VIRGINIA BEACH CITY PUBLIC SCHOOLS

A H E A D O F T H E C U R V E

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The mission of the Virginia Beach City Public Schools, in partnership with our entire community, will empower every student to become a life-long learner who is a responsible, productive and engaged citizen within the global community.

DEPARTMENT OF CURRICULUM AND INSTRUCTION

2512 George Mason Drive P.O. Box 6038

Virginia Beach, VA 23456-0038

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