Objectives of Anatomical Sciences

Orhan E Arslan, DVM, PhD
Department of Pathology and Cell Biology
University of South Florida Morsani College of Medicine

General:
1. Understand the anatomical position.
2. Recognize the anatomical terms identifying orientation planes and directions.
3. Develop the skills necessary for basic anatomical dissection.
4. Locate structures on x-rays, CT and MRI scans following the lists provided in the lab.

Objectives of the Musculoskeletal System

1. Discuss the microscopic anatomy of the skin and explain the various layers associated it.
2. Illustrate the developmental basis of bones, cartilages and muscles, and explain embryologic basis of congenital defects associated with the musculoskeletal system.
3. Identify the microscopic characteristics of the bones, cartilage, ligaments and muscles.
4. Describe the bony landmarks that serve as attachments for muscles, and their roles in determining the range and direction of movement.
5. Discuss the functions of various groups of muscles, determine their attachments, relationships, and ascertain the deficits associated with their dysfunctions.
6. Compartmentalize the muscles based on their locations, functions, and describe the complications associated with their dysfunctions.
7. Identify the ligaments and cartilages that are associated with joints, discuss their stabilizing roles, and discuss situations that most likely produce their rupture.
8. Define the fascial coverings of the muscles and associated spaces, and describe their functional significance.
9. Explain the basic anatomy and classification of joints, the mechanism of actions of the muscles on these joints, and factors that produce the rupture of muscles and ligaments that lead to their dislocations
10. Identify bony and skin landmarks that help to determine the underlying structures as means to perform physical examination and make diagnosis.
11. Discuss the roles of the muscles in the formation of triangles, canals, and spaces, and recognize the contents of these entities.
12. Identify the muscles that form the walls of the thoracic, abdominal and pelvic cavities, and describe their relationship to each other.
13. Describe the anatomic basis of hernia and content of the hernial sac in various regions of the body.
14. Explain the muscular, ligamentous and cartilaginous structures that stabilize the vertebral column and facilitate its movements.

Vertebral Column

1. Recognize the abnormal curvatures of the vertebral column
2. Describe the features of a typical vertebra and associated ligaments
3. State the anatomic basis of disc herniation
4. Explain the characteristics of the zygopahysial joints and their role in back pain
5. Discuss the structural basis of back pain

Back

Superficial Back

1. Recognize the superficial muscular layer of the back
2. Outline the relationships of these muscles to each other
3. State the attachments of the individual muscles of the superficial group of the back
4. Explain the functional roles of the muscles and associated dysfunctions
5. Discuss the shared attachments and function among muscles within this group

Deep Back & Suboccipital

1. Outline the characteristics of the intrinsic back muscles
2. Define the pattern of attachments of the intrinsic back muscles
3. Describe the functions of the intrinsic back muscles
4. Identify the boundaries and contents of the suboccipital triangle
5. Discern the specific areas of attachments of the suboccipital muscles

Upper Extremity

Shoulder and pectoral region

1. Describe the bony landmarks, ligaments and muscles of the upper extremity
2. Recognize the distinguishing features of the glenohumeral, sternoclavicular and acromioclavicular joints
3. Discuss the pertinent clinical implications associated with dislocation of the above joints and the sequele of rupture of the related ligaments
4. State the specific attachments and functions of the scapular muscles
5. Discern the spaces bounded by the scapular muscles and describe their contents
6. Outline the dysfunctions observed as a result of paralysis of one muscle or a group of muscles
Axilla and Arm
1. Define the axilla
2. Discuss the boundaries of the axilla
3. Discern the general contents of the axilla
4. Follow the attachments of the muscles of the anterior arm
5. Explain the unique and functional characteristics of the muscles of the anterior arm
6. Identify the specific attachments of triceps brachii
7. Discuss the boundaries and contents of the spaces formed by the long head of triceps

Forearm and Elbow
1. Recognize the characteristics of the radius and ulna and the distal end of the humerus
2. Outline the effect of the muscular pull in fractured radius and distal end of humerus
3. Explain the muscles of the anterior and posterior forearm and associated movements
4. Discern the ligaments of the elbow joint and the anatomic basis of dislocations involving this joint

Hand
1. Recognize the characteristics of the wrist joint
2. Explains the compartments of the hand, associated muscles and movements
3. Discuss the features of the carpometacarpal, metacarpophalangeal and interphalangeal joints
4. Discern the anatomic basis of pathological conditions involving the hand and wrist

Skull, facial region & Temporomandibular Joint
1. Discern the characteristics of the calvaria in the adult and newborn
2. Describe the layers the form the scalp and associated features
3. Discuss the general attachments and functions of the muscles of facial expression
4. Recognize the anatomic features of the TMJ and muscles of mastication

Temporal, Infratemporal and Pterygopalatine Fossae
1. Explain the boundaries of the temporal, infratemporal and pterygopalatine fossae
2. Discern the musculoskeletal contents of the fossae
3. Discuss the routes of communication between the temporal fossa and infratemporal fossa
4. Describe the openings and gaps that connect the infratemporal to the pterygopalatine fossae
5. Recognize the routes of communication between the middle cranial fossa, infratemporal and pterygopalatine fossae

Neck

Superficial Neck and Triangles

1. Discuss the structures that lie within the superficial fascia
2. Trace the various layers of the deep fascia and neck
3. Describe the attachments of the cervical muscles and their relationships and functions
4. Define the boundaries and contents of the cervical triangles

Deep Neck

1. Define the root of the neck, associated structures and its boundaries
2. Recognize the prevertebral and paravertebral (scalene) muscles
3. Describe the structures that pass through the thoracic outlet
4. Discuss the clinical relevance including thoracic outlet and anterior scalene syndromes

Thoracic Wall & the Pleura

1. Outline the characteristics of the sternum
2. Classify the ribs and describe their various characteristics
3. Outline thoracic outlet syndrome
4. State the boundaries of the superior and inferior thoracic apertures
5. Explain the distinguishing features of the intercostal muscles
6. Identify the contents of the intercostal space and associated clinical implications
7. Discuss the pleura, pleural recess and innervation and associated clinical conditions
8. Define the boundaries and contents of each mediastinum

Abdominal Walls & Peritoneum

Anterior Abdominal Wall & Inguinal region

1. Discern the characteristics of the superficial fascia of the anterior abdomen
2. State the significance of fascial continuation between anterior abdomen and perineum
3. Explain the various layers that form the anterior abdomen
4. Describe the unique features of muscles of the anterior abdomen including attachments and functions
5. Explain the pattern of lamination of the rectus sheath and its contents
6. Describe the boundaries of the inguinal canal
7. Recognize the differences between direct and indirect inguinal hernia as well as femoral hernia

**Posterior Abdominal Wall & Diaphragm**
1. Verify the attachments and unique features of the muscles in the posterior abdomen
2. Describe the basis of positive psoas sign
3. Outline the significance of the fascial coverings of the muscles in the posterior abdomen in the spread of inflammatory fluid and formation of the associate ligaments
4. Discuss the diaphragmatic openings
5. Compare and contrast forms of hiatal hernia
6. Describe the anatomic basis congenital inguinal hernia

**Pelvis & Perineum**
1. Define the boundaries of the superior and inferior pelvic apertures
2. Describe the types of pelves and the characteristics of the muscles that form the pelvic wall
3. List the major differences between the female and male pelvis
4. Explain the course of the obturator internus muscle and fascia, action and associated areas
5. Outline the boundaries of the superficial and deep perineal spaces and their contents

**Lower Extremity**

**Gluteal region, hip joint and posterior leg**
1. Recognize the bony, muscular and ligamentous characteristics associated with the gluteal region, as well as their clinical significance
2. Define the boundaries of the sciatic foramina and the structural organization of the pudendal canal
3. Explain the various features of the hip joint, associated ligaments and muscles, and discuss Hip dislocations
4. Discuss the distinguishing characteristics of the hamstring muscles

**Anteromedial and lateral thigh**
1. Identify the attachments of the anterior and medial groups of thigh muscles
2. Describe the individual functions of the anterior and medial thigh muscles
3. Discern clinically relevant points associated with these muscles
4. Define the boundaries of the femoral triangle and adductor canal

**Knee Joint**
1. Describe the muscles, ligaments, bursae and fibrocartilaginous structures associated with the knee joint
2. Discuss the anatomic basis of the clinical conditions associated with the knee joint
3. Recognize the various movements performed by muscles that act on the knee joint
4. State the basis for clinical manifestations of anterior compartment syndromes

Leg
Anterolateral leg
1. Outline the muscles that forms the Anterolateral leg
2. Describe the general attachments and function of the anterolateral leg muscles
3. Recognize the muscles that share common functions in the anterolateral leg
4. Discuss the significance of anterior compartment syndrome

Posterior leg and foot
1. Describe the characteristics of the ankle joint, associated ligaments and common pathologic conditions
2. Recognize the bony skeleton of the foot, associated joints and ligaments
3. Explain the role of the ligaments and bony skeleton in the maintenance of arch of the foot
4. Discern the muscular arrangement of the foot

Objectives of the Nervous System & the Special senses

Following completion of the study of the nervous system, students will be able to:

1. Describe the developmental origin of the structures associated with the central and peripheral nervous systems, and verify the associated anomalies.
2. Describe the derivatives of the branchial arches and compare them with derivatives of the branchial pouches and clefts
3. Identify the organizational scheme and the gross morphologic characteristics of the peripheral and central nervous systems.
4. Distinguish between somatic and visceral components as well as motor and sensory components.
5. Demonstrate the relationships of the peripheral nervous system and the central nervous system.
6. Understand the concept of segmental innervation and be familiar with dermatomes and referred pain.
7. Address the characteristics of the autonomic nervous system and identify the distinguishing characteristics of the sympathetic and parasympathetic nervous systems.
8. Locate the ganglia associated with sympathetic and parasympathetic nervous systems and identify their connections and distribution.
9. Explain the anatomic and functional differences between the sympathetic and parasympathetic systems, as well as clinical relevance of these systems.
10. Discuss the brain coverings, and ascertain the value of associated spaces between meningeal layers.
11. Demonstrate the pathway of CSF within the ventricular system and central canal; describe the general complications pertaining to their occlusion.
12. Describe the course, locations, functional components of the cranial nerves, and distinguish the clinical conditions that pertain to their injuries.
13. Discuss the macroscopic and microscopic characteristics of the eyeball; identify the functional significances of the irideocorneal angle and refractive media.
14. Demonstrate the actions of the extra- and intraocular muscles and their innervation, as well as functional deficits associated with their lesions.
15. Recognize the layers of the retina and ascertain their relationship to the pigment epithelial layer, verifying the course of the optic nerve.
16. Describe in detail the microscopic and macroscopic anatomy of various components of the ear, verify their boundaries and relationships and recognize the clinical conditions associated with these components.
17. Discuss the anatomic basis of transmission of airborne vibration from the external ear to the cochlear nerve. Recall the anatomy and histology of the kinetic and static receptors, and discuss the key general concepts in their role in maintaining posture and balance.
18. Discuss the formation of the cervical plexus, identify the course and destination of its branches, explain its relationships and demonstrate the clinical deficits associated with their injuries.
19. Illustrate in detail the formation of the brachial plexus; identify the course of the individual nerves associated with this plexus, and the clinical conditions that pertain to their dysfunction.
20. Describe the course and functions of the individual branches of the lumbar plexus, identify their relationship to muscles of the posterior abdominal wall, and verify the clinical conditions associated with their injuries.
21. Recognize the segmental origin of the sacral plexus, follow the course of its branches, and demonstrate the clinical relevance of their dysfunctions.

Development of Brain and Spinal Cord
1. Describe the developmental origin of the structures associated with the central and peripheral nervous systems, and verify the associated anomalies.
2. Describe the primary and secondary neurulation.
3. Outline the derivatives of the neural tube, neural crest cells and ectodermal placodes
4. Discuss the developmental basis of neuroblasts, glioblasts and mesenchymal cells
5. Explain the developmental basis of sensory and motor components of the CNS
6. Identify the common congenital anomalies associated with neuronal development

Gross Features of the Spinal Cord & Brain and the Meninges

1. Outline the morphologic characteristics of the spinal cord
2. Describe the dural coverings of the spinal cord
3. Distinguish between the file terminale internum and externum
4. Define the differences between various segmental levels of the spinal cord
5. Discuss the significance of the denticulate ligaments
6. Identify Rexed lamination of the gray matter and associated functional characteristics
7. Recognize the location, function and general course of the major ascending pathways within the funiculi
8. Define the gross features of the spinal cord and associated spinal meninges and spaces
9. Discuss the morphologic and functional characteristics of the brainstem, associated nerves and peduncles
10. Discern the lobes, gyri and the functional centers of the cerebral cortex
11. Identify the characteristics of the meninges and associated spaces
12. Outline the characteristics of the ventricular system

Peripheral Nervous System

Autonomic Nervous System

1. Compare and contrast the characteristics of the somatic vs. the autonomic nervous systems
2. Contrast the general features of the sympathetic vs. the parasympathetic system
3. Locate the sites of the postsynaptic neurons of the sympathetic and parasympathetic systems
4. Describe the splanchnic nerves as well as the gray and white communicating rami
5. Explain the sites of distribution of the autonomic nerves
6. Recognize the functional features of the sympathetic and parasympathetic fibers, and the clinical conditions associated with their dysfunctions

Somatic Nervous System

Cranial Nerves
1. Describe the course, branches and areas of distribution of the cranial nerves
2. Recognize the common openings/gaps shared by the cranial nerves
3. Discern the functional components of the cranial nerves
4. State the reflexes mediated by the cranial nerves
5. Explain the various deficits associated with cranial nerve dysfunction
6. Describe the course, branches and areas of distribution of the trigeminal, abducens and facial nerves
7. Recognize the reflexes mediated by these nerves
8. Discern the functional components of the trigeminal, abducens and facial nerves
9. Explain the various deficits associated with the trigeminal, abducens and facial nerves
10. Identify the clinical conditions that pertain to these cranial nerves
11. Describe the course and areas of distribution of the cranial nerves VIII, IX, X, XI & XII
12. Explain the functional components of these cranial nerves and associated nuclei
13. Discern the manifestations of lesions of these cranial nerves
14. Identify the common features, deficits, locations associated with these cranial nerves

Eye & Orbit
1. Explain the boundaries of the orbit and associated clinical significance
2. Describe the content of the orbit
3. Recognize the connections of the ciliary ganglion
4. State the movements produced by the extraocular muscles and associated dysfunctions
5. Describe the characteristics of each layer of the eyeball
6. Define the disorders associated with refractive eye media
7. Explain the anatomic basis of glaucoma
8. Discern the various features of the eyelid and lacrimal apparatus

Ear and Audition
1. Discuss the characteristics of the pinna and external acoustic meatus
2. Explain the anatomic basis of referred pain to the ear from tooth decay, sinusitis and cardiac pathology
3. Describe the boundaries of the tympanic cavity
4. Discuss the characteristics of the tympanic membrane
5. Explain the functions of the muscles associated with the tympanic cavity
6. Define the role of the auditory tube in transmission of infection
7. Discern the clinical implication of otitis media
8. Recognize the role of the various components of the inner ear

Cervical Plexus
1. Outline the segmental origin of cervical plexus and its association with the cervical plexus
2. Trace the branches of the cervical plexus and identify their areas of distributions
3. Discuss the possible sites of injury and the manifestations associated with lesions of the cervical plexus

Brachial Plexus
1. Discuss the segmental contributions and the formation of the brachial plexus
2. Recognize the trunks, divisions, cords and branches of the brachial plexus
3. Recognize the common conditions associated with injuries to the trunks of the brachial plexus: Erb’s palsy, Klumpke’s palsy & thoracic outlet syndrome
4. Describe the course, innervation and distributions of the branches of the plexus
5. Discuss crutch palsy, pronator teres syndrome, carpal tunnel syndrome, ulnar palsy & ulnar claw hand
6. Identify the clinical entities associated with injuries to the trunks and branches of the brachial plexus

Intercostal Nerves
1. Define areas of distribution of the intercostal nerves
2. Identify the thoraco-abdominal nerves
3. Discuss the roles of these nerves in the innervation of the pleura and peritoneum particularly in pleural inflammation and appendicitis
4. Correlate herpetic lesions to the course of the intercostal nerve
5. Discuss the functional significance of T1 spinal segment
6. State the clinical significance of intercostal innervation

Lumbosacral Plexus
1. Describe the segmental origin, course and areas of distribution of branches of lumbosacral plexus
2. Discern the sites at which individual and multiple branches of the lumbosacral plexus is (are) prone to damage
3. Explain the relationships of individual branches of the lumbosacral plexus to branches of the femoral, popliteal, tibial and gluteal arteries
4. Describe the motor and sensory deficits associated with compression of the individual branches of the lumbosacral plexus
5. Recognize shared functions among branches of the lumbosacral plexus
6. Identify the nerves that share common segmental origin
7. Correlate meralgia paresthetica to injury to a branch of the lumbosacral plexus
8. Correlate loss of patellar reflex to lesions of branches of the lumbosacral plexus
9. Recognize the anatomic basis of compartment syndromes
10. Explain the anatomic basis of foot drop
Following completion of the study of the circulatory system, students will be able to:

1. Discuss the developmental origin of the heart and major vessels, and demonstrate the various conditions associated with their anomalies.
2. List derivatives of the aortic arches.
3. Identify the microscopic organization of the heart and vessels, and explain the relationship of this structural organization to the occurrence of certain clinical conditions.
4. Describe the stages of hemopoiesis, and the significance of its disruption.
5. Recognize the various components of the heart, their contents, and relationship to other thoracic structures.
6. Recognize the various coverings of the heart and discuss the spaces formed by their reflections.
7. Identify sites of collateral arterial circulations and mechanism of their activation, involved arteries, and functional roles.
8. Describe end arteries, ascertain their common locations, and recognize their significance.
9. Discuss the arterial supply and venous drainage of the heart.
10. Describe the course, relationships, and sites of distributions of branches of the aortic arch to the upper extremity, neck and head, and the clinical implications of their occlusion.
11. Identify the course and relationships of the descending aorta, follow its branches in the thoracic and abdominal cavities, verify its bifurcation, and discuss the functional significance of its branches.
12. Explain the role of the internal iliac artery in the blood supply of the pelvic structures, and their surgical importance.
13. Recognize the importance of branches of the external iliac artery in the determination of various forms of inguinal hernia.
14. Explain the course, relationships, and branches of the femoral, popliteal, and tibial arteries, verify their relationships to the adjacent structures, and describe their roles in certain conditions, such as avascular necrosis, and compartment syndromes.
15. Identify the sites where arterial pulsation can be felt, describe the significance and lack of these pulsations.
16. Demonstrate the embryologic origin and related anomalies, and the histologic features of the lymphoid structures.
17. Describe the locations, relationships and functions of the lymphoid structures.
18. Identify the regional lymph nodes, their locations, and drainage sites, and role in cancer metastasis.
19. Discuss the course of the major lymphatic ducts and associated efferent lymphatic channels, and sites of drainage.
Lymphatic System

1. Describe the primary and secondary lymphoid organs
2. Discern the embryologic origin, characteristics and relationships of the thymus
3. Outline the lymphatic structures
4. Discuss the locations, common characteristics and the relationships of the secondary lymphoid organs
5. Discern the sites of lymphatic drainage
6. Explain the clinical significance of lymphadenopathies and lymphangitis
7. Correlate the rarely seen ‘Elephantiasis’ to the lymphatic system
8. Describe the locations, relationships and clinical significance associated with their inflammation
9. Define the common locations of the appendix vermiformis, relationships and associated dysfunction
10. Discuss the anatomical basis of referred and localized appendicular pain
11. Describe the relationships of the spleen and clinical significance
12. Outline the consequence of traumatic injury to the left upper quadrant of the abdomen

Arterial System
Heart & Pericardium
Aortic Arch and Carotid System
   1. Explain the relationships of the aortic arch and pertinent clinical correlations
   2. Follow the branches of the aortic arch to the neck, head and upper extremity
   3. Outline the course of the carotid arteries and their branches in the neck and head
   4. Describe the branches of the subclavian artery in the neck and head
   5. Define the significant relationships of these arterial branches
   6. Discern the clinical significance associated with major arterial branches

Subclavian & branches of the thoracic and abdominal aortae
   1. Follow the course of the axillary and brachial arteries and describe the significance of their relationships
   2. Discern the clinical significance associated with major arterial branches
   3. Explain the course of the thoracic and abdominal aorta and their relationships
   4. Discuss the branches of the thoracic and abdominal aorta, their relationships and clinical applications
   5. Define the importance of arterial collateral circulation and the role of end arteries in blood supply of viscera

Iliac, Femoral, Popliteal and tibial arteries
   1. Discuss the course and relationships of branches of the internal iliac arteries
   2. Discern the clinical significance associated with their bleeding and occlusions
   3. Describe the course and branches of the external iliac, femoral, popliteal and tibial arteries and their relationships
   4. Explain the clinical significance of these branches
Venous System

Superior Vena Cava & Tributaries
1. Describe the location, drainage site, and tributaries of the superior vena cava
2. State the tributaries of the internal jugular and subclavian veins
3. Recognize the connections between the venous, lymphatic and ventricular systems as well as the aqueous humor
4. Define the characteristics of the dural sinuses
5. Explain the clinical conditions associated with these venous channels

Inferior Vena Cava & Tributaries
1. Describe the course and relationship of the inferior vena cava
2. Identify the veins that drain into the inferior vena cava
3. Explain the anatomic basis of pulmonary embolism
4. Discern the anatomic facts regarding varicocele
5. Explain the veins that form the cava - caval anastomosis and its clinical significance

Portal Vein and Tributaries
1. Describe the course, relationships and tributaries of the hepatic portal vein
2. State the sites and veins that contribute to the porta-caval anastomosis
3. Define the role of porta-caval anastomosis in portal hypertension

Objectives of the Respiratory System

Following completion of the study of the respiratory system, students will be able to:

1. Discuss the developmental origin of the respiratory tract, and confirm its relationships to the upper part of the digestive tract
2. Describe the common embryologic origin of the respiratory and upper digestive tract
3. Explain the microscopic characteristics of all parts of the respiratory system.
4. Explain the gross features of all components of the respiratory system.
5. Demonstrate the close relationships of paranasal sinuses to the nasal cavity.
6. Document the boundaries of the nasal cavity and nasopharynx and associated muscles.
7. Discuss the connection between the nasopharynx and tympanic cavity and its functional significance and clinical value.
8. Describe the cartilaginous, ligamentous and muscular components of the larynx
9. Discuss the course and relationships of the trachea in the neck and thorax
10. Discuss the differences between the right and left primary bronchi, follow their divisions into the bronchopulmonary segments
11. Explain the anatomic features of the right lung and compare it with the left lung
12. Describe the tendinous and muscular parts of the diaphragm, ascertain the locations and the levels at which certain structures pierce the diaphragm.
13. Discuss the acquired and congenital conditions associated with the diaphragm.

Nasal Cavity, Paranasal sinuses & Nasopharynx

1. Describe the boundaries of the nasal cavity
2. Define the components of the nasal septum
3. List the paranasal sinuses that open into the nasal meatuses
4. Outline the locations and characteristics of the paranasal sinuses
5. Discuss the boundaries of the nasopharynx and associated muscles
6. Explain the importance of the pharyngeal and tubal tonsils
7. Describe the anatomy of the auditory tube and its clinical significance

Larynx

1. Describe the location and relationships of the larynx
2. Discuss the muscular and cartilaginous components of the larynx
3. Discern the extrinsic and intrinsic laryngeal ligaments
4. Outline the general functions of the intrinsic laryngeal muscles and their innervation
5. Explain the deficits associated with laryngeal nerve lesions
6. Describe the vasculature of the larynx

Trachea & Lung

- Describe the course and relationships of the trachea and recognize the clinical value of these relationships
- Compare and contrast the right and left bronchi and follow their branches
- Discern the various characteristics of the right and left lung
- Define the bronchopulmonary segmentation
- Compare and contrast the bronchial and pulmonary arteries
Objectives of the Digestive System

Following completion of the study of the digestive system, students will be able to:

1. Discuss the embryologic origin of various components of the digestive system, its role in determining the pattern of blood supply and innervation of the gastrointestinal tract, and the basis of associated developmental anomalies.
2. Demonstrate the embryologic basis of omphalocele, Meckel's diverticulum, and displacement of abdominal organs.
3. Describe the microscopic anatomy of the components the digestive system, correlate it with their function, identify the sites at which this general histologic make up will change, and verify the basis and significance of these changes.
4. Identify the various muscles involved in the masticatory and swallowing processes.
5. Define the pharyngeal muscles, associated gaps between these muscles, and the contents of these gaps.
6. Explain the various relationships of the esophagus, stomach, and intestine, and the role of these relationships in the development of certain clinical manifestations.
7. Discuss the peritoneal coverings of the abdominal and pelvic parts of the digestive system, as well as associated ligaments and pouches, and explore their functional relevance.
8. Differentiate between the retro- & intraperitoneal organs, and discuss the significance of this arrangement.
9. Demonstrate the significance of the relationships of various elements of the digestive system to other structures in the neck, thorax, abdomen, and pelvis.
10. Describe the basis of referred pain from disease processes involving parts of the digestive system.

Oral Cavity

1. Define the boundaries of the oral cavity
2. Discuss the bony components of the hard palate
3. Outline the muscles of the soft palate and associated functions
4. Compare and contrast the characteristics of the anterior 2/3 versus the posterior 1/3 of the tongue
5. Discern the various characteristics of the salivary glands and their innervation
6. State the anatomic basis of the various clinical conditions associated with the oral cavity

Pharynx & Esophagus

1. Discuss the characteristic features of the oro- & laryngopharynx
2. Recognize the clinical significance of the piriform recess
3. Trace the retropharyngeal space distally, identify its boundaries and ascertain its clinical significance
4. Explain the muscular attachments of the pharyngeal muscles
5. Define the relationship of the esophagus and associated clinical significance
6. Recognize the anatomic basis of esophageal varices, hiatal hernia & achalasia

Stomach and Small intestine
1. Outline the characteristics and relationships of the stomach
2. Discuss the significance of the cardia and pyloric region and associated dysfunctions
3. Compare and contrast the relationships of various parts of the duodenum
4. Define the hepatopancreatic ampulla of Vater and sphincter of Oddi
5. Outline the site of attachment and clinical significance of the Treitz ligament
6. Compare and contrast the jejunum and ileum
7. Explain the basis of congenital anomalies if the ileum
8. Define Meckel's diverticulum

Large Intestine
1. State the general characteristics of the large intestine
2. Describe the relationships of the ascending, descending and sigmoid colon
3. Explain the features of the rectum
4. Compare and contrast the ectodermal and endodermal anal canal
5. Describe the anatomy of the external and internal anal sphincters

Liver, Gallbladder & Pancreas
1. Outline the location and lobes of the liver and their relationships
2. Discuss the lobes, the peritoneal reflections associated with the liver
3. Compare and contrast the morphologic and functional divisions of the liver
4. Discern the vascular supply and innervation of the liver
5. Recognize the relationship of the gallbladder, blood supply and liver and associated ducts
6. Describe the relationships of the pancreas, peritoneal reflections, blood supply and innervation
Objectives of the Reproductive System

Following completion of the study of the reproductive system, students will be able to:

1. Explain the developmental origin of the male and female reproductive systems, and discuss the congenital anomalies associated with these systems.
2. List the derivatives of the mesonephric and paramesonephric ducts and their remnants.
3. What is the embryologic basis of uterine agenesis, arcuate uterus, unicornuate uterus, uterus didelphys, septate uterus.
4. Discuss the microscopic anatomy of the male and female reproductive organs and verify their functional characteristics.
5. Demonstrate the gross anatomic features of the male and female reproductive organs; discuss the relationships of each component of this system.
6. Describe the ligaments associated with these organs and discuss their functional roles.
7. Describe the importance of peritoneal pouches and covering or lack of there of it relative to the male and female internal organs.
8. Discuss the structures that form the male and female external genitalia, verify their locations, relationships and associated layers.
9. Explain the anatomic features of the accessory reproductive glands and follow their relationships to the structures associated with the urinary system.

Female Genital Organs

Female Internal Reproductive Organs

1. Describe the relationships of the ovary and the associated ligaments.
2. Discuss the parts of the uterine tube and pertinent ligaments.
3. Recognize the components, relationships and ligaments of the uterus.
4. Explain the location and relationships of the vagina.
5. State the clinical relevance of each of the female internal reproductive structures.

Female External Reproductive Organs

1. Define the boundaries of female perineum.
2. Describe the structure and relationships of the vulva.
3. Outline the components of the clitoris.
4. Outline the boundaries and contents of the superficial and deep perineal spaces and their contents in the female.
**Male Internal Reproductive Organs**

1. Outline the location, and relationships of the prostate  
2. Identify the lobes of the prostate and associated capsules  
3. Discuss the role of the prostatic venous plexus in the spread of prostatic cancer to the vertebral column  
4. Define the location and relationships of the bulbourethral glands and site of opening of the ducts in the spongiose urethra  
5. Describe the course of the vas deferens, its relationships and site of termination  
6. Discern the relationships of the seminal vesicles and follow the union of its duct with the vas deferens

**Male External Reproductive Organs**

1. Define the boundaries of male perineum  
2. Describe the layers and structure of the penis and testes male  
3. List the layers that cover the spermatic cord  
4. Outline the vascular supply, venous drainage and lymphatics of the penis and testis  
5. Outline the boundaries and contents of the superficial and deep perineal spaces and their contents in the male

**Objectives of the Endocrine System**

Following completion of the study of the endocrine system, students will be able to:

1. Discuss the developmental origins of all endocrine glands, and discuss the pertinent congenital anomalies.  
2. List the derivatives of the 3\(^{\text{rd}}\) and 4\(^{\text{th}}\) pharyngeal pouches  
3. Discuss the embryologic origin of the pituitary, thyroid and parathyroid glands  
4. Outline the difference between the origin of the cortex and medulla of the adrenal gland  
5. Discuss the microscopic characteristics of the pituitary, thyroid, parathyroid and adrenal glands  
6. Explain the microscopic anatomy of endocrine glands, and verify their functional and clinical significance.  
7. Describe the gross features, and relationships of the endocrine glands.  
8. Correlate the intricate inter-relationships among these glands and the nervous system.  
9. Discuss the various secretions of the endocrine glands and their functional roles.
10. Describe the characteristics of the pineal gland relative to functional and clinical characteristics
11. Identify the relationships, components, and hormonal features of the pituitary gland
12. Explain the neurohumoral mechanism that governs the neurohypophysis
13. Outline the embryologic origin of thyroid gland and associated anomalies
14. Identify the relationships of the thyroid gland and their significance in thyroidectomy
15. Discuss the gross and histologic features of the parathyroid glands
16. Identify the relationships of the adrenal gland
17. Describe the location and secretion of the islets of Langerhans

**Objectives of the Urinary System**

Following completion of the study of the urinary system, students will be able to:

1. Explain the embryologic origin of the structures that form the urinary system, and demonstrate the congenital defects associated with them.
2. Define the microscopic features of the kidney including the juxtaglomerular apparatus
3. Explain the histologic organization of the ureter, urinary bladder and the male and female urethra
4. Discuss the histologic make up of all components of the urinary system, emphasizing its functional significance.
5. Describe in detail the gross anatomy of the kidney, ureter and urinary bladder, and discuss their relationships in the male and female.
6. Explain the course, parts and relationships of the male urethra.
7. Discuss the course and relationships of the male urethra and contrast with male urethra morphologically and functionally.
8. Define the relationships of the kidney and discuss their clinical importance
9. Identify the coverings of the kidney
10. Describe the arterial supply and venous drainage of the kidney
11. Recognize the various components of a sectioned kidney
12. Trace the course of the ureter in the abdomen and pelvis and ascertain its relationships
13. Explain the gross features and relationships of the urinary bladder in the male and female
14. Discuss the course of the urethra in the female
15. Discern the components of the male urethra and associated glands

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O. Arslan, DVM, PhD- Anatomical Sciences- Objectives-2015