



UNDERGRADUATE MEDICAL EDUCATION (UME)
Medical Doctor Program (MD)

COURSE OUTLINE

Course Number:	MDCN 506.01
Course Name:	Surgery Clerkship
Dates:	January 15, 2024 – April 27, 2025 (Class of 2025)
Schedules and classroom locations:	Rotation schedule & location information will be emailed and posted to Osler.

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Course Description
Please refer to the University Calendar: http://www.ucalgary.ca/pubs/calendar/current/medicine.html#8554

Prerequisites
Please refer to the University Calendar: http://www.ucalgary.ca/pubs/calendar/current/medicine.html#8554

Supplementary Fees/Costs
<ul style="list-style-type: none"> • Lab Coat • Stethoscope

SURGERY CLERKSHIP OBJECTIVES

At the conclusion of the surgery clerkship, students will be expected to:

1. Describe the relevant aspects of the common and/ or life-threatening surgical illnesses, listed in this document, according to the following headings:
 - Definition
 - Epidemiology
 - Causes, including a consideration of each of the following factors:
 - Biological
 - Psychological
 - Social: including ethical and cultural
 - Pathophysiology
 - Clinical features and complications
 - Investigations required to confirm a diagnosis
 - Management
 - Prognosis
2. Provide an approach to the diagnosis of the major presenting problems encountered in surgery.
3. Know the appropriate use and interpretation of diagnostic tests.
4. Incorporate use of evidence-based medicine (EBM)
5. Review the basic science principles relevant to surgery, as learned during the pre-clerkship and expanded on during clerkship, in order to manage the various factors contributing to the patient's illness.
6. Describe the properties of medical and surgical therapies, in terms of their indications, contraindications, mechanisms of action, and side effects.
7. Describe the major principles of ethics as they relate to surgery

Evaluation of Surgical Patients

- Preoperative history / assessment
- Postoperative history / assessment
- Postoperative complication

Preoperative Assessment

1. Discuss tools that may assist in preoperative risk assessment. Consider laboratory studies, imaging studies etc. Include the following:
 - Pulmonary (example: exercise tolerance, pulmonary function testing)
 - Cardiovascular (ASA classification, Goldman criteria, echocardiography thallium studies, Doppler)
 - Renal (BUN/Cr, dialysis history)
 - Metabolic (nutritional assessment, thyroid function)
2. Compare and contrast anesthetic risk factors. Consider the following variables:
 - Age, urgency of intervention, emergent versus elective surgery
 - Associated conditions: pregnancy, diabetes, COPD, valvular or ischemic heart disease, cerebral/peripheral vascular disease, renal insufficiency, etc.
3. Discuss the components of informed consent as it applies to surgical interventions (procedures, transfusions etc.).
4. Discuss conditions that potentially interfere with fluid and electrolyte homeostasis in the perioperative period, and describe strategies for replacement / monitoring. Example: effects of bowel preparation, NPO status, NG drainage, dialysis, operative losses, etc.
5. Describe factors that might impair coagulation or increase risk of bleeding.
 - Discuss the indications, risks and benefits of transfusion therapy.

Postoperative Assessment

1. List the conditions necessary for discharge of a patient to home or to the unit following a general or spinal anesthetic
2. Understand the pharmacological action, benefits, risks, and side effects of various pain control agents.
 - Compare and contrast : parenteral vs. enteral agents and describe the role of epidural and nerve blocks in pain management
 - Calculate the nutritional needs and describe preferred routes of administration of nutritional therapy for patients with various surgical problems.

- Compose nutritional orders and routine laboratory studies utilized to follow response.
- Consider patients with:
 - Inflammatory bowel disease
 - 50% TBSA burn
 - Intestinal fistula
 - Major esophageal resection for tumor
- 3. Discuss history, physical and laboratory findings utilized in nutritional assessment. Be familiar with the most common forms of nutritional & deficiency disorders. Consider: protein-calorie malnutrition, chronic alcoholism, iron & B12 deficiencies, malabsorption syndromes and requirements of the morbidly obese.
- Discuss disease states and surgical interventions for patients at high risk for nutritional impairment.
- Discuss the advantages and disadvantages of nutritional support
- Compare and contrast enteral vs. parenteral administration

Postoperative Complications

Fever	Pain
Wound Dehiscence / Drainage	Shock / Hypotension
Bleeding	Oliguria

Assumptions – the student understands that prevention is the best form of management for postoperative complications, and is knowledgeable about the normal physiology of the cardio-respiratory, gastrointestinal, renal, immunological, neurological, and circulatory systems: and understands the alterations in physiology which are produced by surgical stress. In addition, the student must understand:

- Pathogenesis of infection
- Role of thrombolysis in maintaining vascular integrity
- Normal physiology of blood clotting, including the intrinsic and extrinsic pathways

Objectives

1. Define postoperative fever.
2. Describe the differential diagnosis of a patient having postoperative fever. For each entity, discuss the clinical manifestations, appropriate diagnostic work-up, and management: atelectasis, necrotizing wound infections.

Intraoperative

Malignant Hyperthermia

- Identify patients at risk
- Identify treatment for and dose – Dantrolene
- Identify causative agents and safe agents to use
- Management of airway, oxygenation, ventilation – CO₂, electrolyte imbalances, arrhythmias, fever.
- Observe post event – ICU, PACU

Between 24 – 72 hours

- Pulmonary disorders (atelectasis, pneumonia, respiratory distress / failure)
- Catheter related complications – phlebitis (IV), central line sepsis, UTI (Foley)

After 72 hours

- Infectious (UTI, pneumonia, wound infection, deep abscess, anastomotic leak, prosthetic infection, acalculous cholecystitis, parotitis, sepsis)
- Non-infectious - DVT

3. Discuss the following wound complications:
 - Wound infection, dehiscence, incisional hernia
 - List patient and environmental factors that contribute to a surgical infection after an operative procedure
 - List the 4 classes of surgical wounds and the frequency in which each type may lead to infection
4. Discuss the indication for prophylactic antibiotic use preoperatively. Consider the type of surgery, patient conditions, and alternate agents in patients with allergies.
5. Discuss the most likely pathogens and appropriate antibiotics in the following situations:
 - Acute cholecystitis
 - Acute perforated appendicitis
 - A perforated duodenal ulcer (less than 2 hours following, and greater than 2 hours)
 - A compound fracture
 - A central line infection
 - A dog bite
6. Discuss the various pulmonary complications that may occur in the postoperative patient. For each complication, describe the etiology, clinical presentation, management and methods of prevention:

- Atelectasis, pneumonia, aspiration, pulmonary edema, ARDS
 - Pulmonary embolism (including deep venous thrombosis), fat embolus
7. Discuss the possible causes of hypotension which may occur in the postoperative period. For each etiology, describe its pathophysiology and treatment.
 - Hypovolemia
 - Distribution: sepsis, medications, and spinal epidural anesthetic
 - Cardiogenic: myocardial infarction, arrhythmia, tamponade
 8. Discuss the differential diagnosis and management of postoperative chest pain and arrhythmias.
 - ECG analysis (12 & 16 lead ECG, rhythm assessment)
 - Lab analysis – troponin levels
 9. Discuss disorders of the alimentary tract function following laparotomy which may produce nausea, vomiting, and /or abdominal distention (consider clinical presentation, investigations, and management):
 - Paralytic ileus
 - Intestinal obstruction
 - Acute gastric dilatation
 - Fecal impaction
 10. Discuss precipitating factors and treatment for the following postoperative metabolic disorders:
 - Hyperglycemia
 - Thyroid storm
 - Adrenal storm
 11. Describe the factors which can give rise to alterations in cognitive function postoperatively, as well as their evaluation and treatment:
 - Hypoxia
 - Metabolic and electrolyte abnormalities
 - Functional delirium
 - Medication effect
 - Perioperative stroke
 - Pre-existing alteration

Surgical Bleeding Disorders

12. Describe factors which can lead to abnormal bleeding postoperatively, and discuss prevention and management.
 - Surgical site – inherited and acquired factor deficiencies, DIC, transfusion reactions, operative technique
13. Discuss the history and physical findings that might identify the present and etiology of a bleeding disorder.
 - Name 5 major etiologic factors leading to bleeding disorders
 - Discuss common surgical conditions leading to the Disseminated Intravascular Coagulation (DIC).

Prevention of Postoperative Complications

- Wound complications – attention to strict asepsis surgical techniques, perioperative antibiotics for clean-contaminated wounds, delayed closure of dirty wounds.
- Respiratory complications – discourage smoking prior to elective surgery, encourage deep breathing and coughing exercises postoperatively, sufficient but not excessive analgesia (multimodal analgesia), early postoperative ambulation.
- Oliguria – administer adequate intravenous fluids, assure outflow
- Hypotension – avoid hypovolemia, monitor for arrhythmias, early recognition and treatment of infection, titrate medication doses carefully, NG tube loss fluid replacement
- Bleeding – surgical site – meticulous aseptic surgical technique, screen for factor deficiencies, give platelets and frozen plasma for massive blood loss (follow massive transfusion protocols), patient to refrain from taking herbal supplements, aspirin or non-steroidal anti-inflammatory medications prior to surgery (unless on medication due to cardiac stent)
- Gastro-duodenal – keep gastric pH neutral
- Hyperglycemia – avoid large infusions of glucose, monitor diabetics carefully and administer insulin appropriately
- Adrenal insufficiency – provide stress doses of corticosteroids when adrenals are chronically suppressed
- Thyroid storm – control hyperthyroidism prior to surgery
- Alterations in cognitive function – avoid hypoxia and electrolyte imbalances, titrate medications carefully
- Nausea / vomiting – identify patients preoperatively for those at risk of PONV (Postoperative nausea / vomiting). Treat with preventive medications prior to and post-surgery and rescue agents if vomiting

Fluid, Electrolyte & Acid Base Disorders

- Nausea / Vomiting
- Abnormal serum hydrogen ion concentrations
- Fluid loss

Fluids & Electrolytes

1. List the normal range of Na⁺, K⁺, HCO₃⁻, Cl⁻ in serum and indicate how these ranges change in perspiration, gastric bile and ileostomy contents.
2. List at least four endogenous factors that affect renal control of sodium and water excretion.
3. List at least six symptoms or physical findings of dehydration.
4. List and describe the objective ways of measuring fluid balance.
5. Describe the possible causes, appropriate laboratory studies needed, and treatment of the following conditions:
 - Hyponatremia / Hyponatremia
 - Hyperkalemia / Hypokalemia
 - Hyperchloremia / Hypochloremia
6. Describe the concept of a “third space” and list the conditions that can cause fluid sequestration of this type.
7. List the electrolyte composition of the following intravenous solutions:
 - Normal Saline (0.9%)
 - ½ Normal Saline
 - 5% Dextrose in Water (D5W)

Acid Base Balance

1. Indicate the mechanism, methods of compensation, differential diagnosis, and treatment of the following:
 - Metabolic Acidosis / Metabolic Alkalosis
 - Respiratory Acidosis / Respiratory Alkalosis

Abdominal / Gastrointestinal Surgery – Clinical Presentations

- Acute Abdominal Pain
- Biliary Tract Disease / Jaundice, Abdominal Masses (liver, pancreas and spleen)
- Abdominal wall and groin hernias
- Swallowing difficulty and Pain (dysphagia and odynophagia)
- Gastrointestinal hemorrhage / hematemesis
 - Esophagus, stomach and duodenum
- Colorectal Disease / Diverticular Disease (Inflammatory Bowel Disease, Colon Cancer)
 - Rectal Bleeding – perianal problems, blood in the stool
- Vomiting, Diarrhea and Constipation – bowel obstruction
- Trauma

Acute Abdominal Pain

Assumptions – the student understands the anatomy relationships, normal structure and function of various abdominal viscera, and their associated organ systems; the physiology of pain perception and how to apply this to differentiating visceral, somatic and referred pain patterns involved in abdominal pathology. A basic understanding of the pathophysiology of inflammation, neoplasia, ischemia and obstruction is required.

Skills Students Require

- Knowledge to complete a focused history and physical examination including rectal, genital, and pelvis examinations with emphasis on characterization of findings, differentiation of signs & symptoms of peritonitis and adjunctive maneuvers to enhance diagnostic abilities.
- Knowledge of interpretation of laboratory findings and various imaging modalities that contribute to the diagnosis of common abdominal problems. Consider plan films of the abdomen, CT scans, ultrasound etc.

Objectives

1. Complete a problem focused history for patients presenting with abdominal pain. Emphasis will be on:
 - Characterization of pain (location, severity, character, pattern)
 - Temporal sequence (onset, frequency, duration, progression)

- Alleviating / exacerbating factors (position, food, activity, medications)
 - Associated signs and symptoms (nausea, vomiting, fever, chills, anorexia, weight loss, cough, dysphagia, dysuria, frequency / altered bowel function (diarrhea, constipation, obstipation, hematochezia, melena).
 - Pertinent medical history – prior to surgery or illness, associated conditions (pregnancy, menstrual cycle, diabetes, atrial fibrillation, or cardiovascular disease, immunosuppression). Medications: anticoagulation, steroids etc
2. Demonstrate the components of a complete abdominal examination including rectal, genital and pelvic exams. Relate the significance of the various components of examinations (observation, auscultation, percussion, palpation) as they apply to common abdominal pathologic processes. Examples: distention, visible peristalsis, high pitched or absent bowel sounds, tympany, mass, localized versus generalized guarding and / or rebound tenderness.
 3. Demonstrate and relate the significance of various maneuvers utilized in evaluating acute abdominal pain. Examples: Iliopsoas sign, Rovsing's sign, Obturator sign, Murphy's sign, cough tenderness, heel tap, cervical motion tenderness.
 4. Develop a differential diagnosis for various patients presenting with acute abdominal pain. Differentiate based on:
 - Location – (QRST), RUQ, epigastric, LUQ, RLQ, LLQ symptom complex. Examples: Peri-umbilical pain localizing to RLQ, acute onset of left flank pain with radiation to the testicle etc.
 - Age – pediatric, adult, geriatric
 - Associated conditions – pregnancy, immunosuppression, (AIDS, transplant, chemotherapy, radiation)
 5. Explain the rationale of utilizing various diagnostic modalities in the evaluation of abdominal pain.
 - Laboratory – CBC, amylase, electrolytes, BUN, creatinine, glucose, urinalysis, beta-HCG, and liver profile
 - Diagnostic imaging – flat and upright abdominal x-rays, upright chest x-ray, abdominal ultrasonography, CT scan of abdomen and pelvis, GI contrast radiography, angiography, IVP
 - Special diagnostic / interventional techniques – upper endoscopy, procto-sigmoidoscopy, colonoscopy, laparoscopy.
 6. Discuss the presentation, diagnostic strategy and initial treatment of patients presenting with common or catastrophic abdominal conditions. Identify the patient requiring urgent resuscitation and operative intervention.
 - Acute appendicitis
 - Cholecystitis, biliary colic, choledocholithiasis, cholangitis
 - Pancreatitis
 - Peptic ulcer disease with or without perforation
 - Gastroesophageal reflux
 - Gastritis, duodenitis
 - Diverticulitis
 - Inflammatory bowel disease – Crohn's, Colitis
 - Enterocolitis
 - Small bowel obstruction, incarcerated hernia, adhesions, tumor
 - Colon obstruction – volvulus, tumor, stricture
 - Splenomegaly, splenic rupture
 - Mesenteric ischemia
 - Leaking abdominal aortic aneurysm
 - Gynecologic etiologies – ectopic pregnancy, ovarian cysts (torsion, hemorrhage, rupture), tub-ovarian abscess, salpingitis, endometriosis
 - Genito-urinary etiologies – UTI, pyelonephritis, ureterolithiasis, testicular torsion
 7. Discuss the common non-surgical conditions that can present with abdominal pain. Examples: Myocardial Infarction, pneumonia, pleuritis, hepatitis, gastroenteritis, Keto-acidosis, herpes zoster, nerve root compression
 8. Discuss unique causes of abdominal pain in patients who are immune-suppressed and the implication on Treatment and outcomes. Examples: neutropenic enterocolitis, CMV, enterocolitis, bowel perforation, a calculous Cholecystitis, acute graft rejection.
 9. Discuss the approach to patients with common abdominal problems with emphasis on indications for surgical consultation, indication / contraindications for surgery, complications of disease and intervention, and expected outcomes.

10. Discuss the approach to patients with postoperative abdominal pain. Contrast findings in non-operated patients with regards to presentation, examination, differential diagnosis, and intervention strategies.
11. Discuss the unique considerations and constraints in the evaluation of patients with abdominal pain in various Healthcare environments (emergency room, outpatient clinic or office, acute care hospital).

Biliary Tract Disease / Jaundice / Abdominal Masses

Assumptions – the student is familiar with the normal location, size and consistency of the abdominal viscera, the anatomy of the hepto-biliary system, and understands the mechanisms for production, excretion and metabolism of bile.

Objectives

Biliary Tract Disease

Liver

1. Describe the causes of hepatomegaly
 - Discuss the role of liver function testing, radio-nucleotide imaging, ultrasound and CT scanning in the evaluation
 - Discuss the differential diagnosis of hepatic lesions
 - Benign – cyst, hemangioma, adenoma, FNH, abscess
 - Malignant – metastasis, hepatocellular carcinoma, hepato-blastoma
 - Discuss the role of liver biopsy in the diagnosis
 - Discuss the clinical / radiological features to distinguish the above lesions

Spleen

2. Describe the causes of splenomegaly
 - Define hypersplenism and contrast to splenomegaly
 - Discuss the most common signs and symptoms associated with hypersplenism
 - Discuss the role of splenectomy in the treatment of hypersplenism (vaccination)
 - Discuss the consequences of hyposplenism. How can these be diminished?
 - Discuss the clinical findings and use of diagnostic studies in detecting suspected splenic rupture.
 - Discuss the management of a patient with a ruptured spleen, including resuscitation and surgical approach

Pancreas

3. Define the differential diagnosis of a pancreatic mass
 - Consider benign, malignant and inflammatory lesions
 - Discuss the major complications of pancreatic necrosis and pseudocyst formation
 - Discuss the management of cystic lesions of the pancreas
 - List the etiologies of acute pancreatitis
 - Discuss early and late complications of acute pancreatitis
 - Define chronic pancreatitis and differentiate it from acute pancreatitis

Gallstones

4. Define the clinical presentations of gallstones
 - Chronic cholecystitis and biliary colic
 - Acute cholecystitis, obstructive jaundice, cholangitis, pancreatitis
 - Discuss the clinical features, and diagnostic tests to differentiate the above conditions
 - Discuss the management of asymptomatic gallstones
 - Discuss the indications for and the complications of cholecystectomy
 - Discuss the presentation and pathophysiology of gallstone ileus
 - Discuss the associations of cancer of the gallbladder and gallstones

Jaundice

5. Describe the differential diagnosis of a patient with jaundice
 - Discuss pre-hepatic, intra-hepatic (both non-obstructive) and post-hepatic (obstructive) etiologies
 - Discuss painful vs non-painful, benign vs malignant, inflammatory vs non-inflammatory etiologies
 - List and explain justification for the diagnostic modalities used in the evaluation of a patient with jaundice to include limitations, relative costs and potential risks
 - Discuss importance of the patient's history – estimated duration of illness, associated symptoms (pain and its characteristics) and risk factors
 - Discuss important physical exam findings
 - Define liver function tests – liver panel

- Explain the rationale for using these diagnostic tests in the evaluation of a patient with jaundice. What is the significance of abnormalities?
- Other laboratory tests and their indications (hepatitis profile, peripheral blood smear, Coomb's tests etc).
- Hepato-biliary imaging procedures (ultrasound, CT scan, ERCP, PTHC, HIDA scan, MRCP)
- Discuss the management principles for jaundice (to initial treatment, role and timing of surgery, and timing of appropriate consultation)

Abdominal Masses

1. Describe the most frequently encountered retroperitoneal masses
 - Discuss the appropriate imaging studies and work up for these tumors
 - Discuss the most frequently encountered lymphomas and their treatment
 - Discuss the most common retroperitoneal sarcomas and their management
2. Describe the evaluation and management of abdominal aortic aneurysms
 - Discuss appropriate imaging studies for aneurysms
 - Discuss which patients need angiograms
 - Discuss the relationship of aortic aneurysms to other vascular aneurysms
 - Discuss how to determine which patients need surgical repair of the aneurysm
 - Discuss the risks of surgical treatment and the risks of the aneurysm left untreated
 - Define abdominal carcinomatosis and omental metastasis
 - List common primary tumors causing the above

Abdominal Wall and Groin Hernias

Assumptions – the student understands the anatomic relationships of the abdominal wall musculature and fascia.

Objectives

1. Discuss the differential diagnosis of inguinal pain, mass or bulge. Consider hernia, adenopathy, muscular strain, abscess and aneurysm.
2. Describe the anatomic differences between direct, indirect and femoral hernias.
3. Discuss the relative frequency of indirect, direct, and femoral hernias by age and gender.
4. Discuss the clinical conditions that may predispose to development of inguinal hernia.
5. Discuss the indications, surgical options, and normal postoperative course for inguinal hernia repair and femoral hernia repair.
6. Define and discuss the clinical significance of incarcerated, strangulated, reducible and Richter's hernias.
7. Discuss the differential diagnosis of an abdominal wall mass (consider desmoid tumors neoplasm, hernia, adenopathy, and rectus sheath hematoma).
8. Describe the potential sites for abdominal wall hernias. Consider incisional, umbilical, inguinal, femoral, spigelian and epigastric hernias. Differentiate diastasis recti from abdominal hernia.
9. Compare the nature history and treatment of umbilical hernia in children and adults.
10. Describe clinical factors contributing to the development of an incisional hernia.

Swallowing Difficulty and Pain

Objectives

1. Define dysphagia and odynophagia
2. Describe the differential diagnosis for a patient with dysphagia / odynophagia
 - Motility disorder – neurologic or motor disorders
 - Extrinsic obstruction / compression
 - Intrinsic obstruction – neoplasm, inflammation, foreign body
 - Inflammation / infections
3. Compare and contrast the history, presentation, physical findings, and laboratory findings for these different conditions.
4. Discuss the diagnostic modalities available, how they are used, and how they relate to the normal swallowing mechanism.
5. Describe the options for management of these conditions.
6. Discuss indications for operative vs non-operative management.

Gastrointestinal Hemorrhage / Hematemesis – Esophagus, Stomach & Duodenum

Objectives

Esophagus

1. Define hiatus hernia and the pathophysiology predisposing to reflux esophagitis.
2. Describe the symptoms of reflux esophagitis and discuss the diagnostic procedures used for confirmation of the condition.
3. Discuss the indications for medical versus operative management of esophageal reflux describe the most common anti-reflux operative procedure.
4. List the common esophageal diverticula, their location, their symptomatology and pathogenesis.
5. Describe the pathophysiology and symptoms of achalasia, briefly outline the management options.

Stomach and Duodenum

1. Compare and contrast the common symptoms, pathogenesis, acid secreting pattern, location and natural history of gastric and duodenal ulcer disease.
2. Discuss the significance of the anatomical location of either a gastric or duodenal ulcer with regard to possible complications.
3. List the clinical and laboratory features that differentiate the Zollinger-Ellison Syndrome (gastrinoma) from duodenal ulcer disease.
4. Discuss the complications of peptic ulcer disease, including clinical presentation, diagnostic work-up.
5. Compare the risk of cancer in patients with gastric and duodenal ulcer disease.
6. Identify premalignant conditions, epidemiological factors and clinical features in patients with gastric adenocarcinoma.
7. Describe common types of neoplasms that occur in the stomach and discuss appropriate diagnostic procedures, therapeutic modalities and prognosis for each.
8. Discuss the principles of curative and palliative surgery for patients with gastric neoplasm and discuss the roles of adjunctive or alternative therapy.

Gastrointestinal Hemorrhage

1. Outline the initial management of a patient with an acute GI hemorrhage
 - Discuss indications for transfusion fluid replacement, and choice of fluids.
2. Differentiate upper vs. lower GI hemorrhage
 - Differentiate the clinical presentations of acute and chronic gastrointestinal bleeding from upper and lower GI sources
 - Discuss history and physical exam abnormalities, diagnostic studies.
3. Discuss the differences in evaluation and management of the patient presenting with hematemesis, melena, Hematochezia, guaiac positive stool.

Colo-Rectal Disease

- Rectal Bleeding – perianal problems, blood in the stool
- Diverticular Disease
- Colon Cancer
- Inflammatory Bowel Disease

Assumptions – The student knows:

- the normal anatomy of the colon, rectum, and anus including blood supply and lymphatic drainage
- and understands the physiology of the colon and composition of the bacterial flora
- the basic anatomy of the anal canal and rectum and is familiar with the basics of mechanism for defecation

Objectives

1. Develop a differential diagnosis for a patient with perianal pain (include benign, malignant and inflammatory causes).
2. Discuss the characteristic history findings including:
 - character and duration of complaint
 - presence or absence of associated bleeding
 - relationship of complaint to defecation
3. List the most appropriate investigations used in the diagnosis of patients with blood in the stool or rectal bleeding.
4. Discuss “classic” history and physical exam findings for:
 - fissure
 - perianal abscess

- fistula-in-ano
 - internal hemorrhoids
5. Outline a plan for diagnostic studies, preoperative management and treatment for each of the above.
 6. Outline the principles of medical and surgical management of patients with blood in the stool.

Diverticular Disease

1. Discuss the clinical findings of diverticular disease of the colon
2. Discuss five complications of diverticular disease and the appropriate surgical management.
3. Discuss massive rectal bleeding, including differential diagnosis, initial management, appropriate diagnostic studies and indications for medical versus surgical treatment.

Carcinoma of the Colon, Rectum and Anus

1. Identify common signs and symptoms of carcinoma of the colon, rectum and anus.
2. Discuss the appropriate laboratory, endoscopic and x-ray studies for the diagnosis of carcinoma of the colon, rectum and anus.
3. Outline the treatment of carcinoma located at different levels of the colon, rectum and anus.

Ulcerative Colitis and Crohn's Disease

1. Differentiate ulcerative colitis and Crohn's disease of the colon in terms of history, pathology, x-ray findings, treatment and risk of cancer.
2. Describe the presentation / potential complications of ulcerative colitis and Crohn's disease.
3. Discuss the role of surgery in the treatment of patients with ulcerative colitis who have the following complications of intractability, toxic megacolon, cancer, perforation and bleeding.
4. Discuss the role of surgery in the treatment of Crohn's disease with the following complications of fistula, bleeding or stricture.

Vomiting / Diarrhea / Constipation

Objectives

Vomiting

1. Discuss the differential diagnosis for a patient with emesis:
 - Consider timing and character of the emesis and associated abdominal pain
 - Contrast dysmotility vs. ileus vs. mechanical obstruction
 - Describe the clinical presentation and etiologies of gastric outlet obstruction
 - Discuss the diagnosis and management of obstructive ulcer disease
 - Describe the signs and symptoms of small bowel obstruction
 - Describe the common etiologies of mechanical small bowel obstruction
 - Discuss the potential complications and management of small bowel obstruction
 - Outline the initial management of a patient with mechanical small bowel obstruction including laboratory tests and x-rays
 - Contrast the presentation and management of partial vs. complete small bowel obstruction
 - Differentiate the signs, symptoms and radiographic patterns of paralytic ileus and small bowel obstruction

Diarrhea

1. Contrast the pathology, anatomic location and pattern, cancer risk and diagnostic evaluation of ulcerative colitis and Crohn's disease.
2. Discuss the role of surgery in the treatment of patients with ulcerative colitis and Crohn's disease.
3. Discuss the clinical manifestations, risk factors, diagnosis and management of pseudomembranous colitis.

Constipation

1. Describe the clinical presentation and etiologies of large bowel obstruction:
 - List the diagnostic methods utilized in the evaluation of potential large bowel obstruction including contraindications and cost effectiveness
2. Outline the diagnosis and management of colonic volvulus diverticular stricture, fecal impaction and obstructing colon cancer:
 - Outline the treatment of carcinoma located at different levels of the colon, rectum and anus. Include a discussion of the use of radiotherapy and chemotherapy for each
3. Describe the presentation and treatment of acute and chronic colonic pseudo-obstruction.

Pediatric Surgery

Objectives

1. Discuss the diagnosis and treatment of abdominal problems with particular relevance to the pediatric population.
Include: neonates, infants, children, and adolescents. Be able to list the abdominal problems, characteristic of each group, and to outline diagnostic and intervention strategies for:
 - Congenital: hernias, malrotation, midgut volvulus
 - Hirschsprung's Disease
 - Pyloric Stenosis
 - Intussusception
 - Meckel's Diverticulitis
2. Compare and contrast acute appendicitis in the young child. Discuss issues relevant to presentation, diagnosis, treatment and complications. Example – perforation risk occurs within 6-12 hours after onset of symptoms in the very young child.
3. Discuss concerns for infants/ young children undergoing anesthesia that may differ from adults.
 - Compare pre / post-operative orders

Notes:

- The nutritional requirements are much greater in infants and young children than in adults.
- Appendicitis is the most common condition in children requiring abdominal surgery (peak incidence is mid-teens, and rare under age 3).
- Pediatric problems often present as some form of intestinal obstruction. The differential diagnosis may be simplified by dividing into age groups.

Infants & Toddlers	Toddlers and up
Pyloric Stenosis	Appendicitis
Incarcerated Inguinal Hernia	Incarcerated Hernia
Intussusception	Meckel's Diverticulum (GI bleed)
Hirschsprung's Disease	Tumors
Malrotation (with midgut volvulus)	Malrotation (with midgut volvulus)

- Meckel's Diverticular Disease can be remembered by the rule of "2's":
 - 2 years old, 2 inches in length, 2% incidence in the population, 2 feet from the ileocecal valve, 2% are symptomatic, 2 times more common in boys

Breast Disorders and Surgery

- Breast mass
- Abnormal Screening Mammogram
- Benign breast conditions / malignant conditions
- Painful breasts (mastalgia)
- Nipple discharge

Assumptions – The student understands:

- The topographic and structural anatomy of the breast.
- The hormonal changes that affect breast physiology in the pre-menopausal stage, during pregnancy and post-partum, post-menopausal effects in women
- The principles of screening, in relation to detection of asymptomatic disease in the general population

Skills:

1. Perform a routine physical examination relevant to a patient with a breast complaint
2. Given a patient with a breast mass, describe physical exam characteristics and assess patient for any lymphadenopathy in the axilla

Objectives

1. Describe the clinical approach (diagnosis to management) to common benign breast conditions including breast pain (mastalgia), breast cyst(s), breast abscess, benign breast nodules, non-bloody nipple discharge in the female patient.

2. Describe the clinical approach (diagnosis to management) to an asymptomatic patient presenting with an abnormal screening mammogram. Describe diagnostic features of the mammogram that require further intervention, versus conservative management or continued surveillance.
3. Describe the clinical approach to a patient (diagnosis to management) presenting with a breast mass, discovered by self-exam or physical exam.
4. Describe the radiologic investigations used to screen, diagnose, and follow breast disorders, such as mammogram, ultrasound, MRI. Describe indications for use of each modality. Review the current recommendations for screening mammography.
5. Describe breast cancer risk factors and the impact they have on patient risk for developing breast cancer. Describe hereditary breast cancer syndromes BRCA-1 and BRCA-2.
6. Describe the indications for breast biopsy. Describe options for breast biopsy including: Fine needle aspirate, core needle biopsy, image guided biopsy, excisional biopsy. Understand the rationale for using any one biopsy option over another.
7. Describe the pathological diagnoses that arise from breast biopsy, including:
 - Benign features (i.e. fibrocystic change, sclerosing adenosis, duct ectasia)
 - Benign nodules (i.e. fibroadenoma, intraductal papilloma, complex cyst)
 - Phyllodes tumour
 - Atypical ductal hyperplasia
 - Atypical lobular hyperplasia
 - Ductal carcinoma in situ
 - Lobular carcinoma in situ
 - Invasive ductal carcinoma
 - Invasive lobular carcinoma
8. Discuss the management and clinical treatments for breast cancer, including:
 - Surgery – roles of partial/segmental mastectomy, total mastectomy, sentinel lymph node biopsy, axillary dissection
 - Radiation therapy – role in breast conserving surgery, locally advanced disease
 - Chemotherapy – indications for chemotherapy, Her-2-Neu targeted agents
 - Hormonal therapy – ER/PR antagonists, duration of treatment, side effects/risks
9. Discuss the psychosocial impact the diagnosis of breast cancer may have on patients and their families; familiarize with issues such as fertility, ongoing surveillance, counseling/support, options for breast reconstruction, risk reduction strategies/lifestyle changes.
10. Discuss the clinical approach to a male patient presenting with a breast mass. Determine etiologic risk factors for gynecomastia and appropriate investigations.
11. Describe the clinical approach to a patient with rare breast presentations such as:
 - Bloody nipple discharge
 - Inflammatory breast cancer (diffuse inflammation and thickening of the breast, “peau d’orange”)
12. Describe conservative management strategies for mastalgia.

Endocrine Disorders

Neck Mass in Thyroid / Parathyroid Hyperthyroidism Hypercalcemia / Crisis Pituitary / Adrenal Tumor – Cushing’s Syndrome	Cancer of Thyroid MENS Syndrome Endocrine Adenoma Syndromes
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Neck Mass in Thyroid / Parathyroid

Assumptions – The student has an understanding of head & neck anatomy, and thyroid / parathyroid and adrenal physiology and can perform a competent head and neck physical exam.

Objectives

1. Describe neck masses that commonly present.
2. Describe the signs, symptoms & etiologies of inflammatory neck masses.
3. Describe the most common neoplastic neck masses and their origin.
4. Discuss the role of fine-needle cytology, open biopsy, CT scan, MRI, thyroid scan and nasopharyngeal endoscopy in the diagnostic work up of a neck mass.
5. List the indications for thyroid function and studies, serum calcium, serum cortisol levels.
6. Discuss the relationship of smoking and alcohol abuse to squamous cell cancers.
7. Discuss the evaluation and differential diagnosis of a patient with a thyroid nodule.

8. Discuss the common thyroid malignancies, their cell of origin and their management. Which has the best prognosis? The worst? Which is associated with MENS syndrome?
9. Discuss the relationship of radiation exposure to thyroid malignancy.
10. Discuss the common non-neoplastic thyroid diseases that could present as a mass.
11. Discuss the symptoms associated with hyperthyroidism and discuss treatment options.
12. Discuss diagnosis and management of thyroiditis.
13. List the disease, signs and symptoms associated with hypercalcemia, and the treatment of hypercalcemic crisis.
14. Discuss the complications which may occur after parathyroid surgery

Adrenal Gland

1. Describe the clinical features of Cushing's syndrome and how causal lesions in the pituitary, adrenal cortex, and extra-adrenal sites may be distinguished from a diagnostic standpoint.
2. Discuss the medical and surgical management of Cushing's syndrome in patients with:
 - Adrenal adenoma
 - Pituitary adenoma causing adrenal hyperplasia
 - ACTH producing neoplasm

Neurosurgery

Altered Neurological Status	Headaches
Traumatic Head Injuries	Traumatic Spinal Injuries
Radicular Pain	Brain Tumour

Assumptions – Students understand basic central and peripheral neurological anatomy and function, including sensory/motor endpoints, and must be able to demonstrate competence in organizing and carrying out a neurological history and examination.

Skills

1. Perform a focused neurological history and examination.
2. Interpret various neurologic imaging studies (CT scans, MRI, x- rays).

Objectives

1. Describe the physiology of intracerebral pressure (ICP and cerebral perfusion pressure (CPP), including the effects of blood pressure, ventilatory status, fever, and fluid balance on ICP and CPP.)
 - Recognize the Cushing reflex and it's clinical importance (brain herniation)
2. Discuss the etiology, diagnosis and management of the patient with headaches
 - Describe the signs, etiology and treatment of subarachnoid hemorrhage and intracerebral hemorrhage
 - Describe the relative incidence and location of the most common brain tumors, clinical manifestations, diagnosis, and general treatment strategies
 - Differentiate brain abscesses from tumors, and discuss the treatment of intracranial infections
3. Describe the evaluation and management of a patient with an acute focal neurologic deficit.
4. Differentiate TIA and stroke:
 - Differentiate anterior vs. posterior circulation symptoms
 - Outline the diagnostic tests and monitoring of carotid occlusive disease including role of angiography and noninvasive methods
5. Describe the signs, symptoms, and treatment of common peripheral nerve entrapment syndromes, as well as other nerve injuries.
6. Discuss the role of surgery in the management of pain, movement, and seizure disorders.
7. Discuss the use of diagnostic studies available for evaluation of radicular pain. Include spine radiographs, CT scan, MRI, bone scan, myelography, and angiography.
8. Outline the key steps in management of life threatening neurosurgical conditions, thereby preventing possibility of further injury (i.e. ABC, spinal precautions, and urgent use of medications).

Otolaryngology Surgery

Ear and Nose Problems

Epitaxis	Acute Sinusitis
Ear Pain	Acute Vertigo
Nasal Pathology	Nasopharyngeal Carcinoma
Hearing Loss / Tinnitus	

Assumptions – The student understands the anatomy and physiology of the outer ear and inner ear, nose and paranasal sinuses, upper airway and neck. The student understands the physiology of hearing and phonation.

Skills

1. Perform a focused head and neck history and examination.
2. Interpret audiogram, head and neck CT scans and lateral soft tissue x-rays.

Objectives

1. Discuss the differential diagnosis of ear pain (otalgia)
 - Consider infection, trauma, neoplasm, inflammation, vascular
 - Contrast etiologies in children *versus* adults
2. Discuss the diagnosis, treatment and complications of acute and chronic otitis media.
 - Include indications for myringotomy tube placement
3. Outline the evaluation of a patient presenting with hearing loss:
 - Differentiate between conductive and sensorineural hearing loss
 - Identify treatable causes
4. Outline the evaluation of a patient presenting with tinnitus. Describe the potential etiologies and management.
5. Describe the risk factors, diagnosis and management of epistaxis.
 - Describe the indications and techniques for nasal packing
6. Discuss the causes and mechanisms of chronic rhinitis/ rhinorrhea.
 - Outline the evaluation and management of chronic rhinitis
7. Describe the indications for tonsillectomy.
8. Outline the evaluation of a patient with a salivary gland mass.
 - Describe the potential etiologies
 - Describe the common tumors of the salivary gland and their management

Orthopedic Surgery – Common Musculoskeletal Presentations

Painful Joints / Bone / Joint Infections

Back Pain

Traumatic Injuries – refer to Trauma Surgery Section

Fractures

- Fractures (open and closed) and dislocations /limb injuries
- Complications associated with fractures (i.e. compartment syndrome, nonunion)
- Osteoporosis
- Reactions of bones/ “The Holes in Bones”
- Bone / joint infections
- Spinal fracture and cord injury
- Back pain and sciatica
- Hand and soft tissue injuries
 - nerves, muscle, ligaments
 - includes plastics, human bites
- Nerve entrapment syndromes
- Pediatric Ortho
 - Assessment of injured limb in child
 - Fractures, growth plate injuries and bone remodeling
 - Neonatal and newborn orthopedics
 - Spinal deformity – kyphosis, scoliosis, spondylolisthesis
 - Spontaneous onset of limp – Legg Calve Perthes disease, slipped capital femoral epiphysis, septic arthritis
 - Neuromuscular disorders – Cerebral Palsy, Spina Bifida

Skills

1. Demonstrate a focused musculoskeletal and neurologic exam.
2. Interpret plain films, CT and MRI findings of common entities presenting with orthopedic symptoms.

Objectives

Painful Joints / Bone / Joint Infections

1. Describe signs and symptoms of infectious processes of bones and joints
2. List and discuss the diagnostic workup used in making a definitive diagnosis of a bone or joint infection.
3. List and discuss the laboratory and radiologic techniques used in diagnosing osteoarthritis and rheumatoid arthritis.

Back Pain

1. Elicit history and physical exam findings that permit a focused evaluation of back pain. Incorporate a detailed neuromuscular assessment.
2. Describe the key manifestations of various back pain syndromes. Consider: acute vs. chronic, age and gender, occupational & recreational risk factors.
3. Recognize radicular pain symptoms (herniated disc and correlate neurologic findings with neuro-anatomic level of disease).
4. Develop a differential diagnosis, initial evaluation and treatment strategies for:
 - Herniated disc
 - Spondylosis/ spondylolisthesis
 - Scoliosis
 - Osteoporosis & degenerative disc disease
 - Primary & metastatic tumors of the spine
 - Infectious: osteomyelitis, epidural and para-spinal abscess
 - Traumatic (musculoskeletal strain, vertebral fractures/dislocation and cord injury)
5. Discuss the use of diagnostic studies available for evaluation of back and leg pain. Include spine radiographs, CT scan, MRI, bone scan, myelography, angiography.
6. Discuss the indications for surgical consultation and treatment in problems addressed above.
7. List potential complication of surgery on the spine as well as unique concerns for perioperative management and rehabilitation / recovery.

Traumatic Injuries – Refer to Trauma section

Fractures

1. Define open and closed fractures, dislocations and subluxations.
2. Describe clinical and radiological features of fractures and management priorities in treatment.
3. List vascular, neurological and musculoskeletal complications in treating fractures.
4. Define and list signs, symptoms, and diagnostic criteria of a compartment syndrome and treatment.

Plastic Surgery

Burns / Thermal Injuries
Hand Trauma
Non-Healing Wounds

Skin and Soft Tissue Lesions
Bites (human and animal)

Skin & Soft Tissue Lesions

Objectives

1. Describe the commonly used local anaesthetic agents:
 - Discuss the advantages and disadvantages of epinephrine in the local anesthetic, and special precautions needed on the digits
 - Discuss safe dosage ranges of the common anesthetics and the potential toxicity of these drugs
2. Describe the common benign skin lesions and their treatment (papillomas, skin tags, subcutaneous cysts, and lipomas).
3. Describe the characteristics, typical location, etiology and incidence of basal cell and squamous skin cancers:
 - Discuss the relationship to solar irradiation, ethnicity, previous tissue injury, & immunosuppression
 - Discuss the characteristics of malignant skin lesions, which distinguish them from benign lesions
 - Discuss the appropriate treatment of small and large basal and squamous cancers and their prognosis
4. Describe the characteristics, typical locations, etiology and incidence of malignant melanoma:
 - Discuss the relationship of melanoma to benign nevi and characteristics, which help differentiate them
 - Discuss risk factors for melanoma. What are the lesions which have high potential for malignant transformation?
 - Discuss the various types of melanoma and prognosis for each type
 - Discuss the relationship of size and thickness to prognosis.
 - Discuss the usual treatment for cutaneous melanoma including margins, depth and lymph node management including sentinel node mapping

5. Describe the incidence, etiology, epidemiology and classification for soft tissue sarcomas:
 - Discuss the features which differentiate benign from malignant soft tissue tumors
 - Discuss staging and how the stage impacts prognosis for these tumors
 - Discuss the potential role and extent of surgery in their treatment; chemotherapy, radiation, immunotherapy
6. Hand injuries and infections:
 - Discuss the examination of the hand and the diagnosis and initial treatment of acute hand injuries
 - Describe the clinical features and indications for treatment of human bites.
7. Burns:
 - Recognize immediacy to treat the acutely burned patient with regard to airway, breathing and circulation
 - Non healing wounds: refer to section on vascular disorders

Thoracic Surgery

Chest Pain and Dyspnea
Chest Lesions
Esophageal Perforation

Mediastinal Mass
Chest Trauma
Esophageal Cancer

Objectives

Chest Pain and Dyspnea

1. Describe the causes, diagnosis, and treatment of spontaneous pneumothorax
 - Discuss the underlying pulmonary pathology you might expect to find
 - Discuss the role of observation, tube thoracostomy, and surgical management of this condition
2. Describe the common etiologies for hemothorax:
 - Discuss an appropriate diagnostic evaluation for a patient with hemothorax
 - Discuss the appropriate management of blood in the pleural cavity
 - Discuss the most common non-traumatic causes of hemothorax

Chest Lesion

1. Discuss the types of primary lung cancer
 - Discuss the risk factors, presentation, diagnostic tests, and treatment
2. List the most common sources of metastatic lesions in the lung, and discuss the management of metastatic disease in the chest.
3. Discuss the diagnostic modalities available to investigate chest lesions (pulmonary mass, chest wall tumour, pleural disease).

Mediastinal Mass

1. Describe the mediastinal compartments of the chest.
2. Describe the tumours of the anterior, middle and posterior mediastinal compartments.
3. Describe the presentation, diagnosis and management of anterior mediastinal tumours.

Esophageal perforation

1. Classify esophageal perforations.
2. Describe the presentation, diagnosis and management of spontaneous esophageal perforation (Boerhaave's syndrome).

Esophageal Cancer

1. Describe the presentation, clinical findings, investigations and treatment options for esophageal cancer.

Chest Trauma

1. Describe the diagnostic evaluation, differences between blunt and penetrating mechanisms of injury and the initial management of:
 - Thoracic injury (consider hemo/ pneumothorax tension, tamponade, pulmonary contusion massive air leak, widened mediastinum, flail chest)

Trauma Surgery

The objectives included in this material have been adapted from the Advanced Trauma Life Support (ATLS) course of the American College of Surgeons.

The following sections are included in addition to the multiple trauma patients:

Abdominal Trauma	Urinary Tract Injuries	Traumatic Bone / Joint Injuries
Head Trauma	Vascular Injuries	Nerve Injuries
Face and Neck Trauma	Hand Injuries	Skin Wounds
Tendon Injuries	Thermal (Burn and Cold Injury)	

The Trauma Patient with Multiple Injuries

Multiple or severe trauma is the leading cause of death in the first four decades of life and entails astronomical costs. The initial observation and treatment may influence the ultimate outcome of these victims and reduce their morbidity and mortality. The psychological impact of acute trauma must also be addressed.

Terminal Objectives

Students will demonstrate their ability to:

1. Perform an examination of a multiply injured patient based on the priorities reflecting primary and secondary survey techniques.
2. Implement immediate resuscitative measures for life threatening conditions. Identify non-life and limb threatening injuries and outline the initial management.

Enabling Objectives

Students will be able to:

1. Establish treatment priorities for the following:
 - Airway and cervical spine control
 - Breathing
 - Circulation
2. Describe the immediate management of the following:
 - Airway Obstruction
 - Shock and overt hemorrhage
 - Pneumothorax or hemothorax
 - Cardiac tamponade
3. Demonstrate the following procedures:
 - Cervical spine immobilization
 - Needle decompression of the chest
 - Closed cardiac massage
 - Intubation and use of the bag valve mask
 - Obtaining intravenous access
4. Perform a complete systematic physical examination once the patient is stabilized.
5. List the appropriate diagnostic procedures for conditions identified during the complete examination.
6. Describe the appropriate fluid resuscitation of a trauma victim.
7. Discuss the types, etiology and prevention of coagulopathies typically found in patients with massive hemorrhage.
8. Describe the diagnostic evaluation, differences between blunt and penetrating mechanisms of injury and the initial management of:
 - Closed head injury (consider Glasgow Coma Scale, ICP subdural hematoma, epidural hematoma, diffuse axonal injury, basilar skull fractures & CSF leaks)
 - Spine injury (consider mechanism of injury, level of injury, use of steroids, immobilization, neuron exam, management of shock)
 - Thoracic injury (consider hemo/ pneumothorax, tension pneumothorax, tamponade, pulmonary contusion, massive air leak, widened mediastinum, flail chest)
 - Abdominal injury (consider role of physical exam, ultrasound, CT, peritoneal lavage, operative vs. non-operative management of liver and spleen injury, which patients need laparotomy, management of hematomas)
 - Urinary injury (consider operative vs. non-operative renal injury, ureteral injury, intraperitoneal and extraperitoneal bladder injury, urethral trauma, when not to place a Foley, candidates for cystogram, relationship to pelvic fracture)
 - Orthopedic injury (consider open vs. closed fractures, compartment syndromes, concepts of immobilization (splinting, internal fixation), treatment of patients with pelvic fractures, hemorrhage control, commonly associated vascular injuries)
 - Describe the early management of a major burn.

TRAUMA: Abdominal Injury

- Blunt trauma
- Penetrating trauma

Blunt trauma generally leads to higher mortality rates than penetrating wounds and presents greater problems in diagnosis. A high index of suspicion is needed for these injuries which require urgent surgical management.

Objectives

Students will demonstrate their ability to:

1. Outline the principles of management of abdominal trauma.
2. Perform an initial assessment of the patient and initiate resuscitative measures.
3. Determine whether significant blunt or penetrating abdominal injury exists.
4. List the initial diagnostic procedures for both blunt and penetrating trauma and interpret the results.
5. List the indications for surgery.

TRAUMA: Urinary Tract Injuries

Renal injuries

Urethral injuries

Bladder injuries

Trauma to the urinary system is often associated with major injuries to other organs and structures. Prompt diagnosis and treatment of injuries to the kidneys or urinary conduits are essential to preserve renal function and micturition.

Objectives

Students will be able to:

1. Elicit and interpret information from the history and physical examination to determine the presence of a urinary tract injury.
1. List and interpret the most appropriate investigation used in establishing a diagnosis of urinary tract injury.
2. Outline the principles of the initial management for patients with urinary tract injuries.
3. List the indications for specialized care and/or consultation for a patient with a urinary tract injury.

TRAUMA: Bone / Joint injuries

Major fractures / Dislocations

Open Fractures

Traumatic Amputations

Crush Injuries

Vascular Injuries

Bone and joint injuries are rarely life-threatening, but can be permanently disabling if not managed properly. Patients with apparent isolated extremity trauma should receive the same initial care as those with multi-system trauma.

Objectives

Students will be able to:

1. Evaluate airway, breathing and circulation problems which need immediate attention.
2. Elicit and interpret information from the history and physical examination to outline priorities in the assessment and management of the injured extremity.
3. List those extremity injuries that may be life-threatening.
4. List those injuries that may be limb-threatening.
5. List and interpret the most appropriate investigation used to determine the nature and severity of limb injuries.
6. Outline the basic principles of emergency care of fractures and joint injuries.

TRAUMA: Head Injury

Concussion

Confusion

Intracranial Hemorrhages

Skull Fractures

Scalp Wounds

CSF Leaks

Closed Head Injury

Head injuries are extremely common. Injuries may range from being very minor, requiring reassurance, to potentially lethal. Primary consideration should be given to the stabilization and continued monitoring of the patient.

Objectives

Students will be able to:

1. Perform an immediate mini-neurological examination to determine the severity of the head injury and outline resuscitative measures to be implemented.
2. List the baseline parameters which should be reassessed and monitored in the head injured patient.

3. Outline appropriate diagnostic procedures and the management principles of conscious or unconscious patients with traumatic head injuries.
4. Elicit and interpret those signs and symptoms requiring:
 - Minor treatment and reassurance
 - Observation in the hospital and medical management
 - Immediate surgical intervention
5. Describe the pathophysiology and management of increased intracranial pressure.
6. List the indications for hospitalization.
7. List the indications for specialized care and/or consultation for patients with a head injury.

TRAUMA: Vascular Injuries

Laceration
Compression

Contusion, Spasm
Foreign Body

Vascular injuries are becoming more common. Hemorrhage may be occult and therefore a high index of suspicion is necessary when a wound has been inflicted in the vicinity of a major vessel or where there has been a fracture in an adjacent bone or a crushing injury.

Objectives

Students will be able to:

1. Elicit and interpret information from the history and physical examination to diagnose an arterial injury.
2. Elicit and interpret information from the history and physical examination to diagnose an arterial injury.
3. List and interpret the most appropriate investigations used in the diagnosis of vascular injuries.
4. List the risks involved in the use of tourniquets and clamps.
5. Outline the initial management of arterial injuries.
6. List the indications for specialized care and/or consultation for a patient with a vascular injury.

TRAUMA: Nerve Injuries

Compression / Stretch

Laceration

Contusion

Peripheral nerve injuries often occur as part of more extensive injuries and tend to be unrecognized. Evaluation of these injuries is based on an accurate knowledge of the anatomy and function of the nerve(s) involved.

Objectives

Students will be able to:

1. Elicit and interpret information from the history and physical examination to distinguish a peripheral nerve injury from other non-traumatic neuropathies.
2. Outline the investigations used to diagnose the presence of a traumatic peripheral neuropathy.
3. List the indications for specialized care and/or consultation for a patient with a peripheral nerve or injury.

TRAUMA: Face and Neck Injuries

Whiplash

All injuries to the face should be considered as potentially life-threatening because of potential damage to the airway and central nervous system. In the approach to these problems, assessment and control of vital functions as well as treatment of life-threatening injuries must be given first priority. Definitive treatment of the facial trauma is relatively less urgent.

Objectives

Students will be able to:

1. Evaluate the cardiopulmonary status of the patient.
2. Outline the priorities in the management of a patient with a facial injury.
3. List the most appropriate investigations used to determine the nature and severity of facial injuries.
4. Outline the initial management of patients with facial injuries.
5. List the indications for specialized care and/or consultation for a patient with facial injuries.

TRAUMA: Hand Injuries (Including fingers)

Hand injuries are common problems presenting to emergency departments. The ultimate function of the hand depends upon the quality of the initial care.

Objectives

1. Elicit and interpret information from the history and physical examination to determine the nature and severity of an injury to the hand.
2. Demonstrate the functional examination of the hand.
3. Outline the initial management of hand injuries.
4. List the indications for specialized care and/or consultation for a patient with a hand injury.

TRAUMA: Skin Wounds

Lacerations

Avulsions

Puncture Wounds

Crush Injuries

The majorities of skin and subcutaneous wounds are superficial and can be required under local anesthesia. Prior to wound closure, all patients should be examined thoroughly for evidence of injuries involving important underlying structures.

Objectives

1. Elicit and interpret information from the history and physical examination to determine the nature and severity of a skin wound.
2. Discuss prophylaxis to prevent infection.
3. Outline the principles of wound management.
4. List the indications and contraindications for primary versus secondary closure.
5. Select the appropriate suture material and closure technique.
6. List the indications for specialized care and/or consultation for a patient with a skin wound.

TRAUMA: Tendon Injuries

- Rupture of: Achilles tendon, biceps tendon or extensor tendons of fingers (mallet finger)
- Laceration, transection (of flexor or extensor tendons of fingers)

Tendon injuries are often missed on initial clinical assessment. It is important to identify these injuries early so that appropriate management can be undertaken.

Objectives

1. Elicit and interpret information from the history and physical examination which suggests the presence of common tendon injuries.
2. Outline the principles of management of common tendon injuries.
3. List the indications for specialized care and/or consultation for a patient with a tendon injury.

TRAUMA: Burn Injury

Thermal

Chemical

Electrical

Radiation

Burn injuries are common and are most frequently caused by exposure to external heat. Approximately 85% of them are minor and can be managed in out-patient facilities. Serious burns present a major therapeutic challenge and entail tremendous costs.

Objectives

1. Determine the surface area involved.
2. Differentiate among first, and third degree burns on a clinical and anatomical basis.
3. Elicit and interpret the symptoms and signs of inhalation injury.
4. List the indications for hospitalization for patients with burn injuries.
5. Outline the principles of the immediate management of patients (including children) for major burns requiring hospitalization.
6. Demonstrate the care of minor burn injuries.

TRAUMA: Cold Injury

Frostbite

Hypothermia

Immersion Foot (Trench)

Pernio (Chilblains)

The severity of cold injury depends on a combination of several factors, such as the temperature, the duration of exposure, the degree of humidity, the presence of wind, etc. Since vascular damage is a prominent feature of cold injury, therapeutic measures are primarily aimed at restoring adequate circulation.

Objectives

1. Differentiate among first, second, and third degree frostbite on a clinical and anatomical basis.
2. Describe the principles of care necessary to prevent the extension of the injury.
3. List the indications for surgical debridement.

Urology Surgery

Hematuria	Urinary Obstruction / Stones
Urinary Frequency / Dysuria	Scrotal Mass / Testicular Pain
Elevated PSA / Asymptomatic Patient	Trauma

Assumptions – The student understands the anatomy and embryology of the urinary tract system and is familiar with the embryologic development and descent of the testicle.

Skills

1. Complete a focused H & P for a testicular mass.
2. Distinguish between a normal prostate and prostatic hypertrophy

Objectives

1. Describe the potential etiologies of hematuria and /or dysuria
 - Consider age, presence of pain, character of bleeding trauma
 - Consider occult vs. gross hematuria
2. Discuss the diagnostic modalities available for evaluation of hematuria/ and /or dysuria including cost, risks, indications and limitations.
 - Consider CT, cystoscopy, IVP ultrasound, cysto-urethrogram and retrograde pyelography.
3. Describe the staging and management of renal cell carcinoma transitional cell carcinoma and bladder carcinoma.
4. Outline the evaluation and treatment options for patients with urinary incontinence.
5. Outline the initial evaluation of patients presenting with urinary frequency, nocturia, urgency or urinary retention.
 - Consider pertinent H & P, and diagnostic tests including prostate ultrasound.
6. Discuss types of renal trauma, mechanisms involved, signs, symptoms, appropriate diagnostic evaluation, and the appropriate management.
7. Discuss the work-up and treatment options in the management of patients with calculous disease of the urinary system.
8. Discuss the etiology, presentation, evaluation and management of genitourinary trauma.

Scrotal Pain & Swelling

1. List potential diagnoses for the patient who presents with pain or a mass in the scrotum.
 - Discuss testicular vs. extra-testicular origins, benign vs. malignant causes and emergent vs. non-emergent causes.
2. List history and physical exam findings that will help to differentiate etiologies. Discuss the following issues:
 - Pain – presence, absence, onset, severity
 - Palpation – distinguish testicular from extra-testicular (adnexal) mass effect of Valsalva maneuver
 - Trans-illumination
3. Discuss the diagnostic algorithm for scrotal swelling and/or pain.
4. Discuss the staging and treatment of testicular cancer.
5. Discuss treatment of non-malignant causes of scrotal swelling.
6. Discuss diagnosis and treatment of the undescended testicle (consider age at diagnosis).

Asymptomatic Patient with Positive Test / Elevated PSA

1. Define the clinical presentation, work-up and management of a patient with benign prostatic hypertrophy.
2. Know the significance of the PSA and its implications for screening diagnosis, and follow-up.

Prostate Nodule

1. Understand the significance of a prostatic nodule, the differential diagnosis, evaluation, and treatment.

- Discuss the evaluation of a nodule, role of ultrasound, role of biopsy, different biopsy techniques
2. Discuss the staging of cancer of the prostate and treatment options.

Vascular Surgery

Intermittent Claudication	Painful Swollen Limb
Venous Thrombosis / Leg Pain	Non-Healing Wounds
Vascular Injury (refer to Trauma Section)	Pulsating Abdominal Mass

Leg Pain

1. Describe atherosclerosis, its etiology, prevention and sites of predilection.
2. Describe the differential diagnosis of hip, thigh, buttock, and leg pain associated with exercise:
 - Discuss neurological vs. vascular etiologies of walking induced leg pain.
3. Describe the pathophysiology of intermittent claudication:
 - Discuss the diagnostic work-up of chronic arterial occlusive disease
 - Discuss the role of segmental Doppler studies and arteriography
 - Discuss operative and non-operative interventions for aortoiliac, femoropopliteal and distal vascular occlusion.
4. Describe the pathophysiology of ischemic rest pain.
5. Describe the etiologies and presentation of acute arterial occlusion:
 - Discuss embolic vs. thrombotic occlusion.
 - Discuss the signs and symptoms of acute arterial occlusion (the “P’s”)
 - Discuss the medical and surgical management.
 - Discuss the diagnosis and treatment of compartment syndrome.
6. Describe the differential diagnosis, location, appearance and symptoms of leg ulcers due to arterial disease and venous stasis disease.
7. Describe the factors that lead to venous thrombosis and embolism:
 - Discuss the usual locations for thrombosis
 - Discuss differing implications of deep and superficial venous thrombophlebitis
 - Discuss the common invasive and noninvasive diagnostic tests for DVT
 - Discuss methods for DVT prophylaxis and identify high-risk patients
 - Discuss the risks, benefits and available options for anticoagulation and thrombolysis
 - Discuss the signs, symptoms, diagnostic evaluation and treatment of pulmonary embolism

Pulsating Abdominal Mass – also refer to abdominal mass

1. Describe the evaluation and management of abdominal aortic aneurysms:
 - Discuss appropriate imaging studies for aneurysms
 - Discuss how to determine which patients need surgical repair of the aneurysm
 - Discuss the risks of surgical treatment and the risks of the aneurysm left untreated

Non-Healing Wounds

1. Define “non-healing”.
2. Discuss a differential diagnosis, evaluation, and treatment of a patient with: non-healing lower extremity wound, non-healing wound of the torso, or body area other than the lower extremity.
3. Describe the pathophysiology involved for each of the diagnostic possibilities.
Consider: pressure, ischemia, infection, malignancy, and foreign body.

Vascular Injury

1. Identify the most appropriate investigation used in the diagnosis of Vascular injuries
2. Outline the initial management of arterial injuries
3. List the indications for specialized care and/or consultation for a patient with a vascular injury

Course Text(s)/Recommended Reading/Learning Resources

Reference: "The Manual of Surgical Objectives", 4 th Edition, Curriculum Committee, Association for Surgical Education. Prepared by the Office of Surgical Education (April 2014).

Suggested Texts:

Blackbourne, L. (2012). Surgical recall, 6th edition. Philadelphia: Wolters Kluwer / Lippincott, Williams & Wilkins.

Lawrence, P. (2013). Essentials of general surgery, 5th Ed. Philadelphia: Wolters, Kluwer / Lippincott, Williams & Wilkins.

Mann, B. (2009). Surgery, a competency-based companion. Philadelphia: Elsevier.

Harden, A., & Moore, E. (2009), 6 th edition. Abernathy's surgical secrets. Philadelphia: Elsevier.

Evaluation and Course Requirements

SURGERY Class of 2025

- Final Written MCQ (summative) = MP
- Satisfactory Final Preceptor ITERS = MP
- Midpoint Formative ITER = MC
- Formative Midpoint MCQ = MC*
- Logbook = MC*
- 1 EPA #1 = MC
- On-call Expectations = MC
- Clinical Expectations = MC
- Attendance and participation in teaching sessions = MC
- Professionalism Expectation = MP
- Meet all expectations outlined in Core Document = MC

MP = must pass (failure to do so will result in overall evaluation of "Unsatisfactory" for rotation)

MC = must complete (failure to do so will result in overall evaluation of "Satisfactory with Performance Deficiency" for rotation)

MC* = must complete before rotation deadline (failure to do so will result in requirement to defer summative examination to the deferral/rewrite date)

Please refer to Clerkship Student Handbook - <https://cumming.ucalgary.ca/mdprogram/current-students/clerkship/student-handbook> and core document on OSLER - <https://osler.ucalgary.ca/>

Calculators for MCQ exam – simple calculators are allowed for your exams.

Assessment Dates

The assessment dates provided in the Evaluation and Course Requirements may be subject to change due to circumstances beyond the MD Program's control. In the event that an assessment date must be changed notification of the change will be emailed to the student by the evaluation team and posted on OSLER. Students will be given as much notice of the assessment date change as possible.

The pre-clerkship schedule of all courses can be found on the timetable here
<https://cumming.ucalgary.ca/mdprogram/current-students/pre-clerkship-year-1-2/timetable>

The detailed day by day schedule is found on Osler. <https://osler.ucalgary.ca/>

Grading	
The University of Calgary Medical Doctor Program is a Pass/Fail program. The grading system that will appear on a student's legal transcript is as follows:	
Grade	Description
CR	Completed Requirements
RM	Remedial Work Required
F	Fail
I	Incomplete
W	Withdrawal
MT	Multi-Term (Used for Part A Courses that fall under 2 different terms in the calendar year.)
For Pre-Clerkship - A student's final grade for the course is the sum of the separate components. It is not necessary to pass each mandatory component separately in order to pass the course.	
For Clerkship - A rotation signed off as "Satisfactory with Performance Deficiencies" will appear as a credit on a student's medical school transcript.	

Assignments/Projects
The following criteria shall generally apply to all written assignments. Students are expected to submit all major assignments on or before the due dates. Unless prior arrangements have been made, major assignments worth marks submitted after the specified due date will be considered late. Late major assignments will receive a 0 % grade. Other assignments will not be accepted after the due date.

Timeliness
In general, dates listed in Core Documents are intended to act as guidelines for assisting students to complete their learning activities and assignments in a timely fashion. Students encountering difficulties completing assignments due to health or other serious factors must contact the Course Chair to arrange a deferral of term work. A Physician/Counsellor Statement to confirm an absence for health reasons may be required.

Professional Conduct
As members of the University community, students and staff are expected to demonstrate conduct that is consistent with the University of Calgary Calendar. The specific expectations cited in the Calendar include <ul style="list-style-type: none">• Respect for the dignity of all persons• Fair and equitable treatment of individuals in our diverse community• Personal integrity and trustworthiness• Respect for academic freedom, and• Respect for personal and University (or Host Institution) property.
Students and staff are expected to model behaviour in class that is consistent with our professional values and ethics. Students and staff are also expected to demonstrate professional behaviour in class that promotes and maintains a positive and productive learning environment. All students and staff are also expected to respect, appreciate, and encourage expression of diverse world views and perspectives. All members of the University community are expected to offer their fellow community members unconditional respect and constructive feedback. While critical thought and debate is valued

in response to concepts and opinions shared in class, feedback must at all times be focused on the ideas or opinions shared and not on the person who has stated them.

Where a breach of an above-mentioned expectation occurs in class, the incident should be reported immediately to the Associate Dean or his/her designate. As stated in the University Calendar, students who seriously breach these guidelines may be subject to a range of penalties ranging from receiving a failing grade in an assignment to expulsion from the University.

University of Calgary Medical School – Student Code of Conduct

<https://cumming.ucalgary.ca/mdprogram/current-students/pre-clerkship-year-1-2/student-code-conduct>

Electronic Submission of Course Work

Most assignments will be submitted via email to the Program Coordinator, UME unless otherwise stated. Assignments may be submitted in MS Word or Rich Text formats. It is the student's responsibility to confirm with the Program Coordinator that the assignment has been received. This may be done through utilization of the return receipt function available on most email packages, or by a follow up confirmation email to the Program Coordinator.

It is the Program Coordinator's responsibility to reply to any confirmation email from the student, and to inform the student promptly if there are any problems with the file (unable to open attachment, damaged data, etc.). In such cases, it is the responsibility of the student to promptly consult with the Program Coordinator regarding an alternate delivery method (e.g. courier, fax, etc.). It is the student's responsibility to retain a copy of the original document.

One45 Overview

The MD Program utilizes the One45 Software Program for assessment purposes for all evaluations in Year 1, 2 and 3. Students are able to view completed evaluations online through this software program. Evaluations and assessment data are collected at regular intervals.

It is the student's responsibility to distribute their evaluations to preceptors during any given course and to follow up with preceptors if evaluations have not been completed by the deadline given out by the Undergraduate Medical Education (UME) Office.

In addition to assessments and evaluations, One45 is also utilized to evaluate your preceptors and to gather information from students on their learning experiences.

All students are provided training at the beginning of their program in Year 1. This would include a personal log in access code and password.

One45 is used throughout your training in the MD Program (Undergrad) as well as Residency (PGME).

Website Link to Access One45: <https://calgary.one45.com/>

Problems Accessing One45: Please contact the Academic Technologies at osler@ucalgary.ca

Course Evaluation/Feedback

Student feedback will be sought at the end of each learning session as well as at the end of each course through the electronic UME evaluation tool.

At the end of each learning activity (ie. Lecture, small group, orientations, etc.), students will be asked to complete online evaluation forms to provide feedback to instructors regarding the effectiveness of

their teaching and achievement of the learning objectives. An overall course evaluation will be completed following course completion.

Students are welcome to discuss the process and content of the course at any time with the Course Chairs or Preceptors.

Clinical Core Overview (Pre-Clerkship Only)

Please refer to the Clinical Correlation Guidelines here:

<https://cumming.ucalgary.ca/mdprogram/about/governance/policies>

Course specific learning objectives for Clinical Core in the setting of this course can be found in the course documents.

Clinical Correlation Rules of Conduct

Students and preceptors will not be used as patients for clinical correlation sessions. This means that students will not examine the preceptor, the preceptor will not examine the students and students will not examine one another.

UME Policies, Guidelines, Forms, & TORs

Please refer to the MD program website

<https://cumming.ucalgary.ca/mdprogram/about/governance>

Reappraisals and Appeals

Please refer to the CSM Reappraisal of Graded Term Work and Academic Assessments and CSM UME Academic Assessment and Graded Term Work Procedures for details regarding reappraisals and appeals <https://cumming.ucalgary.ca/mdprogram/about/governance/policies>

Please note by policy and terms of reference if you plan to request a reappraisal of the result(s) of this exam/course, a formal reappraisal request in writing needs to be submitted to md.reappraisals@ucalgary.ca within 10 days of receiving the result.

If the student disagrees with the decision of the UME Student Evaluation Committee, the student may appeal that decision to the UME University Faculty Appeals Committee. Please refer to the [CSM UME Academic Assessment and Graded Term Work Procedures](https://cumming.ucalgary.ca/mdprogram/about/governance) for procedure for appeals.

Academic Accommodation

Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities available <https://live-ucalgary.ucalgary.ca/student-services/access>.

Student Accessibility Services, please contact their office at (403) 220-8237, visit: MacEwan Student Centre room 452 or email: access@ucalgary.ca. Students who have not registered with the Student Accessibility Services are not eligible for formal academic accommodation.

Accommodations on Protected Grounds Other Than Disability

Students who require an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the appropriate Assistant or Associate Dean

Students who require an accommodation unrelated to their coursework, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience).

For additional information on support services and accommodations for students with disabilities, visit <https://live-ucalgary.ucalgary.ca/student-services/access>

Academic Integrity

The University of Calgary is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect.

It is expected that all work submitted in assignments should be the student's own work, written expressly by the student for this particular course. Students are referred to the section on academic integrity in the University Calendar (<https://www.ucalgary.ca/pubs/calendar/current/k-3.html>) and are reminded that plagiarism is an extremely serious academic offence.

Student Misconduct

A single offence of cheating, plagiarism, or other academic misconduct, on term work, tests, or final examinations, etc., may lead to disciplinary probation or a student's suspension or expulsion from the faculty by the Dean, if it is determined that the offence warrants such action. A student is defined as any person registered at the University for credit or non-credit courses.

Freedom of Information and Protection of Privacy

The Freedom of Information and Protection of Privacy (FOIP) Act indicates that assignments given by you to your course instructor will remain confidential, unless otherwise stated, before submission. The assignment cannot be returned to anyone else without your express permission. Similarly, any information about yourself that you share with your course instructor will not be given to anyone else without your permission.

Emergency Evacuations and Assembly Points

Assembly points for emergencies have been identified across campus. The primary assembly point for the Health Sciences Centre (HSC) building is HRIC - Atrium. For more information, see the University of Calgary's Emergency Management website: <https://www.ucalgary.ca/risk/emergency-management/evac-drills-assembly-points/assembly-points>

Emergency Evacuation Procedures - <https://www.ucalgary.ca/risk/emergency-management/plans-and-procedures>. In the case of an emergency during exam, immediately stop writing the examination and follow the direction of the invigilator and go to the nearest exit. Students should not gather personal belongings.

Internet and electronic device information and responsible use:

Students are welcome to use laptops and other electronic note-taking devices in this course unless otherwise stated. Please be considerate of others when using these devices.

Supports for student learning, success, and safety

Student Advocacy & Wellness Hub (SAWH): <https://cumming.ucalgary.ca/student-advocacy->

wellness-hub/home

AMA Physician and Family Support Program:

<https://www.albertadoctors.org/services/physicians/pfsp>

Student Union Wellness Centre: <https://www.ucalgary.ca/wellnesscentre/>

Safewalk: <http://www.ucalgary.ca/security/safewalk>

Campus security - call (403) 220-5333

Student Success Centre: <https://www.ucalgary.ca/ssc/>

Library Resources: <http://library.ucalgary.ca/>

Student Union (<https://www.su.ucalgary.ca/about/who-we-are/elected-officials/>) or Graduate Student's Association (<https://gsa.ucalgary.ca/about-the-gsa/gsa-executive-board/>) representative contact information

Student Ombudsman: <http://www.ucalgary.ca/ombuds/role>

Copyright

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (<https://www.ucalgary.ca/legal-services/university-policies-procedures/acceptable-use-material-protected-copyright-policy>) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

Wellness and Mental Health Resources

The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness, and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the excellent mental health resources available throughout the University community such as counselling, self-help resources, peer support, or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, <https://www.ucalgary.ca/wellnesscentre/services/mental-health-services>) and the Campus Mental Health Strategy website (<http://www.ucalgary.ca/mentalhealth>).

Research Ethics

If a student is interested in undertaking an assignment that will involve collecting information from members of the public, he or she should speak with the Assistant Dean, Research (UME) and consult the CHREB ethics website (<https://ucalgary.ca/research/researchers/ethics-compliance/chreb>) before beginning the assignment.

ATSSL Guidelines

Please refer to the ATSSL Web Lab PPE Requirement:

<http://www.ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference>