

CORE CURRICULUM FOR

# **SURGICAL TECHNOLOGY**

SIXTH EDITION





# **Core Curriculum for Surgical Technology**

## **Sixth Edition**

**Association of Surgical Technologists**  
**6 West Dry Creek Circle**  
**Littleton, Colorado 80120**  
**(303) 694-9130**  
**[www.ast.org](http://www.ast.org)**

**ISBN 978-0-926805-65-1**

Copyright 2011 (pending) by the Association of Surgical Technologists, Inc. All rights reserved.  
Printed in the United States of America. No part of this publication may be reproduced, stored in  
a retrieval system, or transmitted in any form or by any means, electronic, mechanical,  
photocopying, recording, or otherwise, without the prior written permission of the publisher.



## **INTRODUCTION TO THE *CORE CURRICULUM* FOR SURGICAL TECHNOLOGY, 6<sup>th</sup> EDITION**

Beginning in February 2009, the Core Curriculum Revision Panel began the process of revising the *Core Curriculum for Surgical Technology* (CCST), 5<sup>th</sup> edition. For the first time, the revision process included representatives of the Accreditation Review Council on Education in Surgical Technology and Surgical Assisting (ARC/STSA) and National Board of Surgical Technology and Surgical Assisting (NBSTSA) with the Association of Surgical Technology representatives. The panel immediately acknowledged the important and historical step that was taken when the fifth edition was published in 2002. However, the panel also recognized and discussed many aspects that could be improved. Consequently, the panel agreed upon the theme, Streamline and Combine, for revising the fifth edition, while retaining the curricular goals of reflecting core OR practice and incorporating the changes in technology and practice.

The sixth edition represents a close analysis of each document to determine where information was repeated and could be condensed into one document as well as combining documents for purposes of flow and continuity. The following are four such examples:

- 1) Discharge Planning is combined with PACU.
- 2) Preoperative Case Management, Intraoperative Case Management and Postoperative Case Management are combined into one document, Perioperative Case Management.
- 3) Professional Credentialing and Professional Organizations are combined into one document, Professional Management.
- 4) Legal Issues, Documentation and Risk Management are combined into one document, Legal Issues, Documentation and Risk Management.

Many other examples of Streamline and Combine will be evident.

However, there are instances when information was repeated for purposes of flow and continuity. For example, cells are listed in both Anatomy and Physiology and Microbiology to ensure complete information.

A new feature of the sixth edition is the use of “Information Boxes” to emphasize selected key points. For example, an Information Box is included in the Microbiology document to emphasize that cells are also included in Anatomy and Physiology.

One particular Information Box that merits educators’ attention is included in the General Surgery – Didactic document. The panel thoroughly discussed the approach to be taken when revising the surgical procedures didactic documents and agreed that the lists of surgical procedures in previous editions were intimidating and difficult to teach all of them in the classroom. Consequently, the Co-Related Procedures Concept was adopted and utilizes surgical procedures that are similar when it comes to procedural steps, instrumentation, supplies, patient position, etc. For example, in the General Surgery document, colon resection is listed, but small bowel resection is not listed, since it is

basically the same or co-related procedure. If an educator teaches one intestinal resection, then the educator has basically taught all resections. The use of the Co-Related Procedures Concept has streamlined the list of surgical procedures to be taught in the classroom to provide the educator with additional time to teach surgical procedures, as well as avoid repetition. Many educators may exceed the requirements of the sixth edition when teaching surgical procedures.

The surgical rotation requirements and role description documents underwent a major revision. The following are highlights of the two documents:

- First and Second Scrub Roles and Observation Descriptions
  - The first and second scrub role descriptions are less cumbersome and employ the streamlining concept to clarify the student's role during a surgical procedure in order to facilitate documentation.
  - Observation description has not been included in previous editions, and the sixth edition addresses that concern.
- Surgical Rotation Requirements
  - Immediately evident will be the removal of the levels Minimum, Standard and Best. A set of 120-case requirements has replaced them. In fact, the whole table from page 251 of the fifth edition has been replaced, and educators no longer have to determine what is a level I, II or III case.
  - The new table in the sixth edition includes a maximum of 10 diagnostic endoscopy cases and five vaginal delivery cases that can be counted toward the maximum number of second scrub role cases. However, diagnostic endoscopy and vaginal delivery cases are not mandatory.

AST is grateful to the volunteer members of the Core Curriculum for Surgical Technology Revision Panel and their untiring work over the last 18 months. Without their valuable efforts, we would not be able to advance surgical technology education and keep it on course to provide quality education.



**CONTRIBUTORS TO THE *CORE CURRICULUM FOR  
SURGICAL TECHNOLOGY***

**Sixth Edition Revision Panel**

Dana Grafft, CST, BS (Chair)  
Surgical Technology Program Director  
Iowa Lakes Community College  
Spencer, IA

Connie Bell, CST, FAST  
National/Corporate Director  
Surgical Technology  
Glendale Career College  
Glendale, CA

Benson Bradley, CST, BA  
Surgical Technology Program Director  
Southern Crescent Technical College  
Griffin, GA

Jeff Bidwell, CST, CSFA, KCSA,  
MA, FAST  
Director – Surgical Technology &  
Surgical  
Assisting Programs  
Madisonville Community College  
Madisonville, KY

Angie Burton, CST  
Surgical Technologist  
Black Hills Surgical Hospital  
Rapid City, SD

Lorrie Campbell, CST, BS  
Surgical Technology Clinical Instructor  
Guilford Technical Community College  
Jamestown, NC

Kevin Craycraft, CST, AS-CTE  
Surgical Technology Program Director  
Bluegrass Community & Technical  
College  
Lexington, KY

Gemma Fournier, CST, RN, MSN  
Surgical Technology Program Director  
Niagara Community College  
Sanborn, NY

Kathy Lee, CST, MS, FAST  
Surgical Technology Program Director  
Richland Community College  
Decatur, IL

Mary McNaron, CST, RN, CNOR,  
MSN, MSHRM  
Surgical Technology Program Director  
Gulf Coast Community College  
Panama City, FL

Lisa Reed, CST, RN, CNOR, MS  
Surgical Technology Program Director  
New England Institute of Technology  
Warwick, RI

Edward Watts, CST, CSFA, KCSA,  
AAS  
Surgical Technologist  
Indiana University Health Tipton  
Tipton, IN

**Sixth Edition Review Panel**

Pedro Barrera, III, CST  
Surgical Technology Program Director  
Austin Community College  
Austin, TX

Richard Burrell, CST  
Surgical Technology Program Instructor  
Naval School of Health Sciences  
San Diego, CA

LCDR Julie Conrardy, RN, CNOR, MSN  
Surgical Technology Program Director  
Naval School of Health Sciences  
San Diego, CA

Lynda Custer, CST, MA  
Surgical Technology Program Director  
Baker College  
Clinton Township, MI

Nancy Dankanich, RN, CNOR, BSN, MA  
Surgical Technology Program Director  
Frederick Community College  
Frederick, MD

Marissa Gomez, CST  
Surgical Technology Program Director  
Career Networks Institute  
Orange, CA

Robert Johnson, CST  
Surgical Technology Program Instructor  
Naval School of Health Sciences  
San Diego, CA

Robin Keith, RN, CNOR, BSN  
Surgical Technology Program Director  
Asheville-Buncombe Technical  
Community College  
Asheville, NC

Lorie Lavergne, CST, AAS, FAST  
Surgical Technology Program Director  
Louisiana Technical College  
Lafayette, LA

Suxuan Le, CST  
Surgical Technology Program Instructor  
Naval School of Health Sciences  
San Diego, CA

Tom Lescarbeau, CST, CSFA, AS  
Surgical Technology Program Director  
McCann Technical School  
North Adams, MA

Tracey Ross, CST, EdD  
Patient & Employee Safety &  
Quality Officer  
Lancaster General Health  
Lancaster, PA

Sherry Thornton, CST, CSFA, RN  
Surgical Technology Program Instructor  
Tulsa Technology Center  
Tulsa, OK

Kathy Uribe, CST, MA  
Surgical Technology Program Director  
Southeast Community College  
Lincoln, NE

Sara Vodnick, CST  
Surgical Technology Program  
Externship Coordinator  
Rasmussen College  
Eagan, MN

Grant Wilson, CST, MEd  
Surgical Technology Program Director  
Calhoun Community College  
Decatur, AL

AST acknowledges the contribution to previous editions by the following individuals.

**Fifth Edition**

Amy Croft; CST, CFA; Gemma Fournier, CST, RN; Julia Jackson, CST; Ann McGuinness, CST, RN; Emily Rogers, CST, CNOR; Tracey Ross, CST; Donovan Traverse; CST

**Fourth Edition**

Nelda Coleman, RN; Terry Davis, CST; Donna Donley, RN; Diane Fleming, CST; Chris Keegan, CST; Claire Olsen, RN; Katherine Snyder, CST; Linda Ward-English, CST, CFA; George Clarke CST, CSPDT; Ann McGuinness, CST, RN

**Third Edition**

Nancy Allmers, RN; Susan Austin, CST; Joyce Borndahl, RN; Marifrances Burger, CST; Beatrice Franklin, CST; Margrethe May, CST; Dorothy Moore, RN; Claire Olsen, RN; Kay Yurko, CST; Deborah Rowland, CST

**Second Edition**

Beverly Baker, CST; Sheila Berglund, CST; Joyce Borndahl, RN; Judith Carlson, RN; Jill Crider, CST; Myra Daniels; Lawrence Demarest, PhD; Linda Ward-Dyo, CST; Sherry Flansburg, CST; Katherine Hasenhorl, RN; Marilyn Hodson, CST; Nancy Hodson, CST; Sister Mary Louise Hoeller, DC, RN; Annette T. Jones, RN; Valerie Jumper, RN; Ronald Lucchino, PhD; Dorothy Main, RN; Gerald Rahn, MD; Daniel Sheridan, CST; Ann Steele, RN; Kathleen Uribe, CST; Marilyn Walsh, RN

**First Edition**

Joyce Borndahl, RN; Judith Carlson, RN; Gary DeNota, CST; Linda Ward-Dyo, CST; Angela M. Fazzolari, CST; Sherry Flansburg, CST; Barbara Gay, CST; Sister Mary Louise Hoeller, DC, RN; Annette T. Jones, RN; Valerie Jumper, RN; Ronald Lucchino, PhD; Dorothy Main, RN; Daniel Sheridan, CST; Ann Steele, RN



## THE ASSOCIATE DEGREE IN SURGICAL TECHNOLOGY

Historically, surgical technology programs have been nine to 12 months in length. Surgery, however, has become increasingly more challenging as technology advances, eg laser and robotic surgery. The challenge of meeting the demands for expert assistance during surgical procedures has revealed the need for a broader and deeper educational background for the surgical technologist. The development of each edition of the *Core Curriculum for Surgical Technology* reflects the demand for the educational preparation of surgical technologists who incorporate critical thinking skills as a component in the provision of quality surgical patient care.

Accordingly, with the publishing of the *Core Curriculum for Surgical Technology*, 6<sup>th</sup> edition, it has also become a realization that the training required for entry-level into the profession is difficult to achieve in a 12-month program. This is a driving factor for many schools when developing a surgical technology program and the recognition that the only way the student will be adequately trained is through the completion of an associate degree-level program. Therefore, some programs have made accommodations to the growing curricular demands by shifting content (such as two semesters of anatomy and physiology) into prerequisite courses that are required prior to acceptance into the surgical technology program. Logically, this prerequisite year could be developed into a sequence of courses that provide foundational preparation for sophomore surgical technology courses and comprehensive coverage of each state's general education requirements.

### **AST's Support of the Associate Degree Model for Entry-Level Practice**

The *Core Curriculum for Surgical Technology*, 6<sup>th</sup> edition, reflects the increasing responsibilities and role of the surgical technologist in the operating room. The logical expansion of the duties of the surgical technologist is supported by the Association of Surgical Technologists. Consequently, AST recognizes the associate degree level for surgical technology programs as the educational model that must be offered to prepare graduates to fulfill the entry-level duties of the surgical technologist. This is further supported by the AST Associate Degree Concept Resolution that was approved by the AST House of Delegates in July 1990 and updated by the AST Board of Directors in November 1993.

### **Incorporation of General Education into Program Curriculum**

General education requirements for the associates degree are established by each state board of higher education and variances will be encountered. However, there are general education courses that can usually be assumed as standard requirements for the student to complete as part of the associate degree. The following are statements in support of the recommended levels for students to achieve, as related to general education courses that most boards of higher education require for the associate degree level:

1. Completion of freshman/sophomore college-level English course(s) that incorporates proficiency in writing skills.
2. Completion of freshman college-level mathematics course that should include pre-algebra.
3. Completion of freshman college-level humanities, sociology and/or psychology courses.
4. Incorporation of achievement of freshman/sophomore-level reading skills across the curriculum.
5. Incorporation of writing skills across the curriculum.
6. Completion of freshman-level science courses with a laboratory component, such as anatomy and physiology and microbiology.
7. Demonstrated proficiency in computer skills or completion of a freshman-level course.



## TABLE OF CONTENTS

<b>I.</b>	<b>Healthcare sciences</b>	
A.	Anatomy and physiology	7
B.	Pharmacology and anesthesia	37
C.	Medical terminology	49
D.	Microbiology	63
E.	Pathophysiology	71
<b>II.</b>	<b>Technological sciences</b>	
A.	Electricity	85
B.	Information technology	86
C.	Robotics	88
<b>III.</b>	<b>Patient care concepts</b>	
A.	Biopsychosocial needs of the patient	91
B.	Death and dying	92
<b>IV.</b>	<b>Surgical technology</b>	
A.	Preoperative	
1.	Non-sterile	
a.	Attire	97
b.	Preoperative physical preparation of the patient	98
c.	Patient identification	99
d.	Transportation	100
e.	Review of the chart	101
f.	Surgical consent	102
g.	Transfer	104
h.	Positioning	105
i.	Urinary catheterization	106
j.	Skin preparation	108
k.	Equipment	110
l.	Instrumentation	112
2.	Sterile	
a.	Asepsis and sterile technique	113
b.	Hand hygiene and surgical scrub	115
c.	Gowning and gloving	116
d.	Surgical counts	117
e.	Draping	118
B.	Intraoperative: Sterile	
1.	Specimen care	119
2.	Abdominal incisions	121
3.	Hemostasis	122
4.	Exposure	123
5.	Catheters and drains	124
6.	Wound closure	128
7.	Surgical dressings	137
8.	Wound healing	140

	9.	Tissue replacement materials	144
	10.	Emergency patient situations	146
<b>C.</b>		Postoperative	
	1.	Postanesthesia care unit	147
	2.	Methods of disinfection and sterilization	148
	3.	Sterile storage & distribution	154
	4.	Environmental disinfection of the OR	155
<b>D.</b>		Perioperative case management	157
<b>E.</b>		Assistant circulator role	161
<b>F.</b>		Surgical procedures – didactic	
	1.	Surgical specialties	
	a.	General	162
	b.	Obstetric and gynecology	163
	c.	Genitourinary	164
	d.	Otorhinolaryngology	165
	e.	Orthopedic	166
	f.	Oral and maxillofacial	167
	g.	Plastic and reconstructive	168
	h.	Ophthalmic	169
	i.	Cardiothoracic	170
	j.	Peripheral vascular	171
	k.	Neurosurgery	172
<b>G.</b>		Surgical rotation	
	1.	Surgical rotation case requirements	173
	2.	First and second scrub role and observation	175
<b>V.</b>		Professional practice	
	<b>A.</b>	Professionalism	
	1.	Professional management	179
	2.	Employability skills	181
	3.	Communication skills and teamwork	183
	4.	Ethical and moral issues	185
	5.	Legal issues, documentation and risk management	187
	<b>B.</b>	Healthcare facility information	
	1.	Health care facility organization and management	191
	2.	Physical environment	193
	3.	All-hazards preparation	195

## **Appendices**

### **Appendix A**

- 1. Surgical procedure didactic exemplars
  - a. Colon resection 203
  - b. C-section 211

### **Appendix B**

- 1. Recommended lab skill assessments 219

### **Appendix C**

- 1. Teaching methodologies
  - a. Domains of learning 223
  - b. Learning styles 230
  - c. Master curriculum development 231
  - d. Writing behavioral objectives 235
  - e. Developing a lesson plan 237

### **Appendix D**

- 1. Support documents
  - a. Printed resources 243
  - b. Media resources 247





## **I.     HEALTHCARE SCIENCES**



## ANATOMY AND PHYSIOLOGY

**Objectives:** The learner will:

1. Identify the basic organizational structures of the human body, including body planes, general organization, and terms of reference.
2. Analyze the basic structure of cells and relate cellular components to integrated cell function.
3. Analyze the types of tissue that make up organs and the characteristics of each.
4. Contrast and compare organs of the body.
5. Analyze the different body systems for composition and function.

**Content:**

- I. Organization of the human body
  - A. Body planes
    1. Coronal/frontal
    2. Midsagittal
    3. Oblique
    4. Sagittal
    5. Transverse
  - B. Directional terms
    1. Superior
    2. Inferior
    3. Anterior
    4. Posterior
    5. Medial
    6. Lateral
    7. Proximal
    8. Distal
  - C. Quadrants
    1. RUQ
    2. RLQ
    3. LUQ
    4. LLQ
  - D. Regions
    1. Epigastric
    2. Right hypochondriac
    3. Left hypochondriac
    4. Umbilical
    5. Right lumbar
    6. Left lumbar
    7. Hypogastric
    8. Iliac (right and left)/inguinal
  - E. Cavities
    1. Cranial
    2. Spinal
    3. Thoracic

4. Abdominal
5. Pelvic
6. Dorsal
7. Ventral
- F.** Body organizations
  1. Cell types
    - a. Epithelial
    - b. Connective cell
    - c. Muscle
    - d. Neurons
  2. Tissue types
    - a. Epithelial
    - b. Connective
    - c. Muscle
    - d. Nervous
  3. Organs
  4. Systems
    - a. Integumentary
    - b. Skeletal
    - c. Muscular
    - d. Nervous
    - e. Endocrine
    - f. Immune
    - g. Sensory
    - h. Circulatory
    - i. Lymphatic
    - j. Respiratory
    - k. Digestive
    - l. Genitourinary
    - m. Reproductive
- II.** Cells
  - A.** Basic structure and function
    1. Cell membrane
    2. Cytoplasm
      - a. Centrosome and centrioles
      - b. Mitochondria
      - c. Ribosomes
      - d. Endoplasmic reticulum
        - (1) Rough
        - (2) Smooth
      - e. Golgi apparatus
      - f. Vacuoles
      - g. Vesicles
      - h. Lysosomes
      - i. Cilia
      - j. Flagella

3. Nucleus
    - a. Nuclear membrane
    - b. Nucleolus
    - c. Chromatin and chromosomes
  4. Nucleic acids
    - a. DNA
    - b. RNA
      - (1) Messenger
      - (2) Transfer
      - (3) Ribosomal
  - B. Cell division
    1. DNA replication
    2. Mitosis
    3. Meiosis
    4. Cellular respiration
      - a. Glycolysis
      - b. Anaerobic oxidation
      - c. Aerobic oxidation
  - C. New technology
    1. Cell cloning
      - a. Skin
      - b. Cartilage
    2. Stem cell
- III. Tissues**
- A. Definition
    1. Cellular attachments
    2. Collection of like cells
    3. Common specialized function
    4. Intercellular substances
  - B. Types and functions
    1. Epithelial
    2. Connective
    3. Muscle
    4. Nervous
  - C. Structure and location
    1. Epithelial tissue
      - a. Simple
        - (1) Squamous
        - (2) Cuboidal
        - (3) Columnar
      - b. Stratified
        - (1) Squamous
        - (2) Cuboidal
        - (3) Columnar
        - (4) Lining epithelium

2. Connective tissue
  - a. Structural characteristics
    - (1) Cells
    - (2) Fibers
  - b. Classification and location
    - (1) Loose areolar connective tissue
    - (2) Dense irregular connective tissue
    - (3) Dense fibrous connective tissue
    - (4) Adipose tissue
    - (5) Cartilage
    - (6) Bone
    - (7) Blood
    - (8) Lymph
3. Muscle tissue
  - a. Skeletal
  - b. Visceral
  - c. Cardiac
4. Nervous tissue
  - a. Types of neurons
    - (1) Afferent/sensory
    - (2) Efferent/motor
  - b. Types of neuroglia
5. Muscle contraction
  - a. Contractile elements
  - b. Sliding filament mechanism
6. Neuromuscular excitability
  - a. Nerve impulse
  - b. Neuromuscular junction

#### IV. Organs

- A. Organ
  1. Interrelated unit
  2. Two or more basic tissues
  3. Complex structure
  4. Specific functions
- B. Types of tissues in organs
  1. Heart
  2. Stomach
  3. Nerves
  4. Brain
- C. Organ systems activities
  1. Homeostasis
  2. Response to external and internal environment
  3. Exchange of materials
  4. Regulation and feedback mechanisms
- D. Abnormalities
  1. Anaplasia

2. Aplasia
  3. Atrophy
  4. Dysplasia
  5. Hyperplasia
  6. Hypoplasia
  7. Hypertrophy
- V. Integumentary systems
- A. Functions of skin
    1. Protection
    2. Regulation of body temperature
    3. Prevention of loss of body fluids
    4. Monitoring of external environment
    5. Excretion
    6. Absorption
  - B. Epidermal layers and functions
    1. Structure
      - a. Outermost stratum
      - b. Basal stratum
    2. Functions
  - C. Dermis
    1. Structure
    2. Functions
    3. Auxiliary structures
      - a. Hair follicles
      - b. Nails
      - c. Glands
      - d. Sensory nerve endings
  - D. Hypodermis/subcutaneous tissue
    1. Structure
    2. Functions
- VI. Skeletal system
- A. Skeletal regions and specific bones
    1. Axial skeleton
    2. Appendicular skeleton
  - B. Types of bones
    1. Long
    2. Short
    3. Flat
    4. Irregular
    5. Sesamoid
  - C. Functions of bones
    1. Framework
    2. Support
    3. Protection
    4. Attachment for muscles
    5. Storage of calcium



- 6. Blood cell production
- D.** Formation of bone
  - 1. Osteoblasts
  - 2. Osteocytes
  - 3. Osteoclasts
  - 4. Ossification
  - 5. Haversian system
  - 6. Endochondral bone formation
  - 7. Intramembranous bone formation
  - 8. Callus formation
- E.** Cartilage
  - 1. Types
    - a. Labrum
    - b. Meniscus
  - 2. Characteristics
  - 3. Locations
- F.** Structure of long bones
  - 1. Epiphysis
  - 2. Diaphysis
  - 3. Epiphyseal plate/line
  - 4. Articular cartilage
  - 5. Cortical bone
  - 6. Cancellous bone
  - 7. Medullary canal/cavity
  - 8. Endosteum
  - 9. Periosteum
- G.** Bone markings and features
  - 1. Projections
  - 2. Depressions
  - 3. Articulating surfaces
- H.** Vertebral column
  - 1. Vertebral regions
    - a. Cervical
    - b. Thoracic
    - c. Lumbar
    - d. Sacrum
    - e. Coccyx
  - 2. Parts of a vertebra
    - a. Cervical
    - b. Thoracic
    - c. Lumbar
  - 3. Intervertebral disk components
  - 4. Spinal ligaments
- I.** Joints
  - 1. Synarthrotic
  - 2. Amphiarthrotic

3. Diarthrotic
  4. Capsule
  5. External ligaments
  6. Intraarticular ligaments
  7. Synovial membrane
  8. Bursae
- VII. Muscular system**
- A. Functions of muscle**
    1. Movement
    2. Posture
    3. Heat production
  - B. Types of muscle**
    1. Skeletal
    2. Cardiac
    3. Smooth
  - C. Actions of muscles**
    1. Abduction
    2. Adduction
    3. Depression
    4. Dorsiflexion
    5. Elevation
    6. Eversion
    7. Extension
    8. Lateral rotation
    9. Flexion
    10. Medial rotation
    11. Inversion
    12. Plantar flexion
    13. Pronation
    14. Retraction
    15. Supination
  - D. Categories of skeletal muscles**
    1. Agonist/prime mover
    2. Antagonist
    3. Synergist
    4. Fixator
  - E. Terminology related to skeletal muscle**
    1. Muscle belly
    2. Tendon
    3. Origin
    4. Insertion
    5. Fascia
    6. Bursa
  - F. Name, location, and actions of major muscles**
    1. Face and head
      - a. Muscles of facial expression

- b. Scalp muscles
  - c. Muscles of mastication
    - (1) Temporalis
    - (2) Masseter
    - (3) Intrinsic
    - (4) Extrinsic
- 2. Neck
  - a. Sternocleidomastoid
  - b. Sternohyoid
  - c. Omohyoid
  - d. Thyrohyoid
  - e. Sternothyroid
  - f. Scalene muscles
  - g. Platysma
- 3. Back
  - a. Trapezius
  - b. Latissimus dorsi
  - c. Erector spinae
- 4. Shoulder
  - a. Deltoid
  - b. Rotator cuff components
- 5. Arm
  - a. Biceps brachii
  - b. Triceps brachii
- 6. Forearm
  - a. Flexor group
  - b. Extensor group
- 7. Hand and fingers
  - a. Flexor carpi group
  - b. Extensor carpi group
  - c. Flexor digitorum group
  - d. Extensor digitorum group
- 8. Chest wall
  - a. Pectoralis major
  - b. Pectoralis minor
  - c. Intercostals
- 9. Diaphragm
- 10. Abdominal wall
  - a. External oblique
  - b. Internal oblique
  - c. Transversus abdominis
  - d. Rectus abdominis
- 11. Thigh
  - a. Iliopsoas
  - b. Quadriceps femoris
  - c. Sartorius

- d. Adductor group
  - e. Biceps femoris
  - f. Gluteal muscles
    - (1) Gluteus maximus
    - (2) Gluteus medius
    - (3) Gluteus minimus
- 12. Leg
  - a. Gastrocnemius
  - b. Soleus
  - c. Plantaris
  - d. Extensors
  - e. Peroneus longus
  - f. Peroneus brevis
- 13. Foot and toes
  - a. Peroneus longus
  - b. Tibialis anterior
  - c. Flexor digitorum group
  - d. Extensor digitorum group

### **VIII. Nervous system**

- A. Parts of a neuron and their functions
  - 1. Dendrites
  - 2. Cell body
  - 3. Axon
  - 4. Myelin
  - 5. Schwann cells
  - 6. Neurilemma
- B. Major divisions of the nervous system
  - 1. Central nervous system (CNS)
    - a. Brain
    - b. Spinal cord
  - 2. Peripheral nervous system (PNS)
    - a. Cranial nerves
    - b. Spinal nerves
    - c. Autonomic nervous system (ANS)
      - (1) Sympathetic
      - (2) Parasympathetic
- C. Terminology related to the central nervous system
  - 1. Cell types
    - a. Astrocytes
    - b. Ependymal cells
    - c. Glial cells
  - 2. Gray matter
  - 3. Nucleus
  - 4. Pathways
  - 5. White matter
- D. Major divisions and functions of the brain

1. Parts of the brain
  - a. Cerebrum
    - (1) Hemispheres
    - (2) Fissures
    - (3) Lobes
    - (4) Basal ganglia
    - (5) Limbic system
  - b. Diencephalon
    - (1) Thalamus
    - (2) Hypothalamus
  - c. Mesencephalon
    - (1) Brain stem
      - (a) Midbrain
      - (b) Pons
      - (c) Medulla oblongata
    - (2) Cerebellum
2. Coverings of the brain and cord: meninges
  - a. Dura mater
  - b. Arachnoid mater
  - c. Pia mater
3. Ventricular system
  - a. Anatomy
    - (1) Ventricles
      - (a) Lateral
      - (b) Third
      - (c) Fourth
      - (i) Choroid process
    - (2) Connections
      - (a) Interventricular foramen of Monro
      - (b) Aqueduct of Sylvius
      - (c) Foramen of Magendie
      - (d) Foramen of Luscha
  - b. Functions
    - (1) Production of cerebrospinal fluid
    - (2) Circulation of cerebrospinal fluid

**E. Cranial nerves**

1. Olfactory: I
  - a. Sensory function
    - (1) Smell
2. Optic: II
  - a. Sensory function
    - (1) Vision
3. Oculomotor: III
  - a. Motor function
    - (1) Eye globe movement

- (2) Iris muscle movement
- 4. Trochlear: IV
  - a. Motor function
    - (1) Oblique eye globe movement
- 5. Trigeminal: V
  - a. Motor function
    - (1) Mandibular branch
      - (a) Jaw
      - (b) Tympanic membrane
- 6. Abducens: VI
  - a. Motor function
    - (1) Lateral eye muscle movement
- 7. Facial: VII
  - a. Motor function
    - (1) Motor muscles of facial expression
    - (2) Parasympathetic innervations of salivary glands
    - (3) Parasympathetic innervations of oral cavity mucous membranes
  - b. Sensory function
    - (1) Taste
    - (2) Sensation
- 8. Vestibulocochlear/auditory/acoustic: VIII
  - a. Sensory function
    - (1) Hearing
    - (2) Proprioception
- 9. Glossopharyngeal: IX
  - a. Motor function
    - (1) Parasympathetic innervations of the smooth muscle and glands of the pharynx, larynx, and viscera of the thorax and abdomen
    - (2) Stylopharyngeus muscle
  - b. Sensory function
    - (1) Carotid sinus and body
    - (2) Sensory information of the ear, pharynx, and tongue
    - (3) Taste
- 10. Vagus: X
  - a. Motor function
    - (1) Muscles of the pharynx and most of the larynx, trachea, and abdominal and thoracic viscera
    - (2) Receptors of the aortic arch and body
  - b. Sensory function
    - (1) Sensation of post-auricular area

11. Accessory/spinal accessory: XI
  - a. Motor function
    - (1) Innervates muscles of larynx and pharynx, trapezius and sternocleidomastoid muscles
12. Hypoglossal: XII
  - a. Motor function
    - (1) Tongue
- F. Spinal cord
  1. Functions
  2. External features
    - a. Vertebral segments (regions)
    - b. Conus medullaris
    - c. Cauda equine
    - d. Nerve roots
    - e. Sympathetic trunk and ganglia
- G. Spinal nerve plexuses
  1. Cervical plexus
    - a. Phrenic nerve
  2. Brachial plexus
    - a. Axillary nerve
    - b. Radial nerve
    - c. Median nerve
    - d. Ulnar nerve
  3. Lumbosacral plexus
    - a. Sciatic nerve
- H. Synapse
  1. Structure
  2. Neurotransmitters
  3. Breakdown of neurotransmitters
- IX. Sensory system
  - A. Types
    1. Visual
    2. Auditory
    3. Olfactory
    4. Gustatory
    5. Touch
    6. Proprioception
  - B. Eye
    1. Anatomy
      - a. Orbital bones
        - (1) Frontal bone
        - (2) Sphenoid bone
        - (3) Zygomatic bone
        - (4) Maxilla
        - (5) Palatine bone



- (6) Lacrimal bone
    - (7) Ethmoid bone
  - b. Eyelids
    - (1) Palpebrae
    - (2) Tarsal plate
    - (3) Meibomian glands
    - (4) Eye lashes
  - c. Extraocular muscles
    - (1) Rectus muscles
      - (a) Superior
      - (b) Inferior
      - (c) Lateral
      - (d) Medial
    - (2) Oblique muscles
      - (a) Superior
      - (b) Inferior
  - d. Lacrimal apparatus
    - (1) Lacrimal glands
    - (2) Lacrimal ducts
    - (3) Puncta
    - (4) Lacrimal canals
    - (5) Nasolacrimal sac
    - (6) Nasolacrimal duct
  - e. Conjunctiva
  - f. Globe
    - (1) Fibrous tunic
      - (a) Cornea
      - (b) Sclera
    - (2) Vascular tunic
      - (a) Choroid
      - (b) Ciliary body
      - (c) Iris
      - (d) Pupil
    - (3) Nervous tunic
      - (a) Retina
    - (4) Chambers of the eye
      - (a) Anterior cavity
        - (i) Anterior chamber
        - (ii) Posterior chamber
    - (5) Fluids
      - (a) Aqueous humor
      - (b) Vitreous humor
    - (6) Optic nerve
- 2. Photoreception
  - a. Refractive media
  - b. Accommodation

- c. Light regulation
  - d. Photoreceptors
  - e. Macula lutea
  - f. Fovea centralis
  - g. Optic disc
  - h. Brain pathways
- C. Ear
  - 1. Anatomy
    - a. External ear
      - (1) Auricle (pinna)
      - (2) Tragus
    - b. Middle ear
      - (1) Ossicles
        - (a) Malleus
        - (b) Incus
        - (c) Stapes
      - (2) Oval window
      - (3) Round window
      - (4) Mastoid sinus
      - (5) Eustachian tube
    - c. Internal ear
      - (1) Labyrinth
      - (2) Cochlea
  - 2. Physiology of hearing
    - a. Sound wave reception
    - b. Bone conduction
    - c. Fluid conduction
    - d. Nerve conduction
  - 3. Physiology of balance/equilibrium
    - a. Semicircular canals and vestibule
    - b. Vestibular nerve
- X. Circulatory system: blood
  - A. Components of blood
    - 1. Formed elements
    - 2. Plasma
  - B. Functions of blood
    - 1. Transportation of oxygen, nutrients, and wastes
    - 2. Protection (immune system)
    - 3. Clotting mechanism
    - 4. Acid-base (pH) buffers
  - C. Structure and function of formed elements
    - 1. Erythrocytes
    - 2. Leukocytes
      - a. Polymorphonuclear leukocytes
        - (1) Neutrophils

- (2) Eosinophils
        - (3) Basophils
      - b. Mononuclear leukocytes
        - (1) Monocytes
        - (2) Lymphocytes
    - 3. Thrombocytes
  - D. Terminology related to hematology
    - 1. Hematocrit
    - 2. Hemoglobin
    - 3. Platelet count
    - 4. Red blood cell count
    - 5. Serologic studies
    - 6. White blood cell count
  - E. Blood types
    - 1. Antigen types
    - 2. Antibodies
      - a. Rh factor
        - (1) Rh positive
        - (2) Rh negative
        - (3) Implications in pregnancy
- XI. Cardiovascular system
  - A. Terminology for cardiovascular function
    - 1. Blood pressure
    - 2. Bradycardia
    - 3. Cardiac output
    - 4. Ectopic beat
    - 5. Fibrillation
    - 6. Heart block
    - 7. Heart rate/pulse rate
    - 8. Infarction
    - 9. Normal sinus rhythm
    - 10. Stroke volume
    - 11. Tachycardia
  - B. Anatomic structures of the heart
    - 1. Layers
      - a. Pericardium
      - b. Myocardium
      - c. Endocardium
    - 2. Chambers
      - a. Atria
      - b. Ventricles
    - 3. Valves
      - a. Tricuspid
      - b. Pulmonary
      - c. Mitral
      - d. Aortic

4. Venae cavae
  - a. Superior
  - b. Inferior
5. Pulmonary arteries
6. Pulmonary veins
7. Aorta
8. Coronary arteries and veins
  - a. Right coronary artery
  - b. Left main coronary artery
  - c. Left circumflex artery
  - d. Left anterior descending artery
  - e. Coronary sinus
  - f. Great cardiac vein
  - g. Anterior cardiac vein
  - h. Oblique vein of the left atrium
- C. Location and position of the heart
  1. Mediastinum
  2. Apex
- D. Flow of blood
  1. Atrial contraction
  2. Ventricular contraction
  3. Relaxation
- E. Heart sound source
  1. First heart sound
  2. Second heart sound
- F. Regulating mechanisms of heart rate
  1. Autonomic regulation
- G. Conductive pathway of the heart
  1. Sinoatrial node
  2. Atrial myocardium
  3. Atrioventricular node
  4. Bundle of His and bundle branches
  5. Purkinje fibers
  6. Ventricular myocardium
- XII.** Circulatory system: peripheral vascular
  - A. Types of blood vessels
    1. Artery
    2. Arteriole
    3. Capillary
    4. Venule
    5. Vein
    6. Venous sinuses
  - B. Structure of each type
    1. Tunica adventitia
    2. Tunica media
    3. Tunica intima

- a. Valves
- C. Major systemic arteries
  - 1. Aortic arch
  - 2. Brachiocephalic (innominate)
  - 3. Common carotid
    - a. External carotid
    - b. Internal carotid
  - 4. Circle of Willis
  - 5. Subclavian
    - a. Vertebral
    - b. Internal thoracic/mammary
    - c. Axillary
    - d. Brachial
    - e. Radial
    - f. Ulnar
  - 6. Thoracic aorta
    - a. Intercostals
  - 7. Abdominal aorta
    - a. Celiac trunk/axis
    - b. Gastric
    - c. Splenic
    - d. Hepatic
    - e. Superior mesenteric
    - f. Renal
    - g. Gonadal
    - h. Inferior mesenteric
    - i. Common iliac
      - (1) Internal iliac
      - (2) External iliac
    - j. Femoral
      - (1) Superficial
      - (2) Deep (profunda)
    - k. Popliteal
    - l. Posterior tibial
    - m. Peroneal
    - n. Anterior tibial
    - o. Dorsalis pedis
- D. Major systemic veins
  - 1. Inferior vena cava
  - 2. Superior vena cava
  - 3. Cranial venous sinuses
  - 4. Internal jugular
  - 5. Azygos system
  - 6. Portal system
  - 7. Superficial system, upper limb
    - a. Cephalic

- b. Basilic
  - 8. Superficial system, lower limb
    - a. Greater saphenous
    - b. Lesser saphenous
  - E. Fetal circulation
    - 1. Placenta
    - 2. Umbilical vein
    - 3. Ductus venosus
    - 4. Foramen ovale
    - 5. Ductus arteriosus
    - 6. Umbilical arteries
  - F. Pulse points
    - 1. Brachial
    - 2. Carotid
    - 3. Dorsalis pedis
    - 4. Facial
    - 5. Femoral
    - 6. Popliteal
    - 7. Posterior tibial
    - 8. Radial
    - 9. Superficial temporal
  - G. Factors that affect blood pressure
    - 1. Blood viscosity
    - 2. Blood volume
    - 3. Cardiac output
    - 4. Elasticity of arteries
    - 5. Peripheral vascular resistance
      - a. Vasoconstriction
      - b. Dilation
- XIII. Lymphatic system
- A. Types and locations of lymphoid tissue
    - 1. Tonsils
      - a. Pharyngeal
      - b. Palatine
      - c. Lingual
    - 2. Thymus
    - 3. Spleen
    - 4. Peyer's patches
    - 5. Regional lymph nodes
  - B. Functions of lymph glands
    - 1. Filter lymph fluid
    - 2. Produce T and B lymphocytes
    - 3. Produce monocytes
    - 4. Antibody formation
    - 5. Special functions of spleen

- C. Lymph fluid
  - 1. Composition
  - 2. Drainage pathways
- D. Lymph ducts
  - 1. Thoracic duct
  - 2. Right lymphatic duct
- E. Edema
  - 1. Definition
  - 2. Causes
- XIV. Respiratory system
  - A. Respiratory pathway: characteristics and functions
    - 1. Nares
    - 2. Nasal cavity (choanae)
    - 3. Nasal conchae (turbinates)
    - 4. Nasopharynx
    - 5. Oropharynx
    - 6. Laryngopharynx
    - 7. Epiglottis
    - 8. Larynx
    - 9. Vocal cords (arytenoids)
    - 10. Trachea
    - 11. Carina
    - 12. Primary bronchi
    - 13. Secondary bronchi
    - 14. Bronchioles
    - 15. Alveolar ducts
    - 16. Alveoli
    - 17. Pulmonary capillaries
  - B. Lungs
    - 1. Hilum
    - 2. Lobes
    - 3. Bronchopulmonary segments
    - 4. Right and left sides
  - C. Blood supply
    - 1. Pulmonary artery
    - 2. Pulmonary vein
  - D. Pleural space
    - 1. Parietal pleura
    - 2. Visceral pleura
    - 3. Pleural recesses
    - 4. Pleural fluid
  - E. Mechanisms of inspiration and expiration
    - 1. Nervous control
      - a. Medullary respiratory center
      - b. Phrenic and intercostal nerves
      - c. Vagus nerves



- 2. Chemical control
      - a. Carbon dioxide
      - b. Oxygen
    - 3. Diaphragm in inspiration and expiration
    - 4. Intercostal muscles in inspiration and expiration
    - 5. Changes in intrapulmonic (lung ) pressures
  - F. Terminology related to respiratory volume
    - 1. Expiratory reserve
    - 2. Inspiratory reserve
    - 3. Residual volume
    - 4. Tidal volume
    - 5. Total capacity
    - 6. Vital capacity
  - G. Terminology for breathing abnormalities
    - 1. Apnea
    - 2. Cyanosis
    - 3. Cheyne-Stokes respiration
    - 4. Dyspnea
    - 5. Hypercapnia
    - 6. Hyperventilation
      - a. Tachypnea
      - b. Hyperpnea
    - 7. Hypoxia
- XV. Digestive system**
- A. Abdominal cavity features
    - 1. Peritoneum
      - a. Parietal
      - b. Visceral
    - 2. Peritoneal cavity
    - 3. Retroperitoneal space
  - B. Alimentary tract/canal
    - 1. Mouth/oral cavity
      - a. Hard palate
      - b. Soft palate and uvula
      - c. Tongue
      - d. Salivary glands
        - (1) Parotid
          - (a) Stenson's duct
        - (2) Submandibular
          - (a) Wharton's duct
        - (3) Sublingual
          - (a) Rivinus duct
      - e. Teeth
      - f. Function
        - (1) Saliva secretion

- (2) Form food bolus
- 2. Pharynx
  - a. Structure
  - b. Function
- 3. Esophagus
  - a. Structure
    - (1) Layers
    - (2) Lower esophageal sphincter
  - b. Function
- 4. Stomach
  - a. Structure
    - (1) Cardiac sphincter
    - (2) Fundus
    - (3) Body
    - (4) Antrum
    - (5) Pylorus
    - (6) Pyloric sphincter
    - (7) Rugae
    - (8) Greater curvature
    - (9) Lesser curvature
    - (10) Omentum
      - (a) Greater
      - (b) Lesser
  - b. Functions
    - (1) Secrete mucus
    - (2) Chemical digestion of carbohydrates, proteins
      - (a) Hydrochloric acid
      - (b) Pepsin
      - (c) Gastric acid
    - (3) Mechanical digestion of carbohydrates, proteins
    - (4) Absorption
      - (a) Water
      - (b) Simple sugars
      - (c) Alcohol
      - (d) Salts
      - (e) Some medications
- 5. Small intestine
  - a. Structure
    - (1) Duodenum
      - (a) Duodenal bulb (cap)
      - (b) Second portion
      - (c) Third portion
    - (2) Jejunum
    - (3) Ileum

- (4) Ileocecal valve
    - (5) Microvilli
  - b. Functions
    - (1) Digestion
    - (2) Absorption
      - (a) Nutrients
      - (b) Liquids
      - (c) Electrolytes
      - (d) Vitamins
    - (3) Hormone secretion
  - c. Layers of digestive tube wall
    - (1) Mucosa
    - (2) Submucosa
    - (3) Muscularis
    - (4) Serosa
- 6. Large intestine
  - a. Structure
    - (1) Cecum
    - (2) Appendix
    - (3) Ascending colon
    - (4) Transverse colon
    - (5) Descending colon
    - (6) Sigmoid colon
    - (7) Mesocolon
  - b. Associated structures
    - (1) Tenia
    - (2) Haustra
    - (3) Epiploic appendices
    - (4) Hepatic flexure
    - (5) Splenic flexure
    - (6) Ligament of Treitz
    - (7) Mesentery
  - c. Functions
    - (1) Final digestion
    - (2) Decompose bilirubin
    - (3) Absorption/production
      - (a) Vitamins
        - (i) B complex
        - (ii) Vitamin K
    - (4) Compaction
- 7. Rectum
  - a. Structure
  - b. Function
- 8. Anal canal
  - a. Structure
    - (1) Anus

- (2) Sphincters
      - (a) Internal
      - (b) External
  - b. Functions
    - (1) Storage of stool
    - (2) Defecation
- C. Liver
  - 1. Structure
    - a. Right lobe
    - b. Left lobe
    - c. Falciform ligament/ligamentum teres
    - d. Capsule
  - 2. Functions
    - a. Production of bile
    - b. Production of proteins for blood plasma
    - c. Production of cholesterol
    - d. Conversion of glucose/glycogen storage
    - e. Regulation of blood levels of amino acids
    - f. Synthesis of hemoglobin
    - g. Conversion of ammonia to urea
    - h. Filtering the blood of drugs and toxins
    - i. Regulation of blood clotting
    - j. Production of immune factors
    - k. Removal of bacteria from blood
- D. Biliary system
  - 1. Structure
    - a. Gallbladder
      - (1) Pear-shaped organ
      - (2) Location
      - (3) Cystic duct
      - (4) Cystic artery
      - (5) Triangle of Calot
    - b. Biliary tree
      - (1) Right and left hepatic duct
      - (2) Common hepatic duct
      - (3) Common bile duct
      - (4) Sphincter of Oddi
      - (5) Ampulla/papilla of Vater
  - 2. Functions
    - a. Gallbladder
      - (1) Storage of bile
      - (2) Concentration of bile
    - b. Biliary tree
      - (1) Transport
        - (a) Waste
        - (b) Bile

- E. Pancreas**
  - 1. Structure**
    - a.** Head
    - b.** Neck
    - c.** Body
    - d.** Tail
    - e.** Islet of Langerhans
      - (1)** Alpha cells
      - (2)** Beta cells
    - f.** Pancreatic duct of Wirsung
  - 2. Functions**
    - a.** Productions and secretions
      - (1)** Insulin
      - (2)** Glucagon
      - (3)** Somatostatin
    - b.** Enzymes of protein digestion
      - (1)** Lipase
      - (2)** Trypsin
      - (3)** Chymotrypsin
      - (4)** Amylase
    - c.** Sodium bicarbonate
- F. Basic nutrients**
  - 1.** Carbohydrates
  - 2.** Fats
  - 3.** Proteins
  - 4.** Mineral salts
  - 5.** Vitamins
  - 6.** Water
- G. Terminology related to digestion and elimination**
  - 1.** Absorption
  - 2.** Anabolism
  - 3.** Bolus
  - 4.** Catabolism
  - 5.** Constipation
  - 6.** Chyme
  - 7.** Defecation
  - 8.** Diarrhea
  - 9.** Digestion
  - 10.** Flatus
  - 11.** Incontinence
  - 12.** Ingestion
  - 13.** Jaundice
  - 14.** Metabolism
  - 15.** Peristalsis
  - 16.** Reflux
  - 17.** Regurgitation

18. Swallowing ulcer
- XVI. Genitourinary
  - A. Structures and functions
    1. Kidneys
      - a. Anatomy
        - (1) Nephron
          - (a) Glomerulus
          - (b) Renal tubule
          - (c) Bowman's capsule
          - (d) Proximal convoluted tubule
          - (e) Loop of Henle
          - (f) Distal convoluted tubule
          - (g) Juxtaglomerular apparatus (JGA)
        - (2) Calyx
          - (a) Minor
          - (b) Major
        - (3) Renal pelvis
      - b. Function
        - (1) Filters and excretes waste
        - (2) Regulates blood pressure
        - (3) Secretes rennin
        - (4) Metabolizes vitamin D and  $\text{Ca}^{2+}$
        - (5) Homeostasis of fluid volume
        - (6) Releases angiotensin
    2. Renal vessels
      - a. Renal artery
      - b. Renal vein
    3. Ureters
      - a. Anatomy
      - b. Function
    4. Bladder
      - a. Anatomy
        - (1) Dome
        - (2) Layers
          - (a) Wall
          - (b) Muscle
          - (c) Mucous membrane
        - (3) Trigone
        - (4) Bladder neck/sphincters
      - b. Function
        - (1) Storage of urine
        - (2) Evacuation of urine
    5. Urethra
      - a. Anatomy
        - (1) Male
          - (a) Bladder neck

- (b) Prostatic urethra
    - (c) Distal urethra
    - (d) Meatus
  - (2) Female
    - (a) Urethra
    - (b) Meatus
- b. Function
  - (1) Transports
    - (a) Urine
    - (b) Semen
- c. Urine composition
  - (1) Normal components
    - (a) Water
    - (b) Nitrogenous/metabolic wastes
    - (c) Mineral salts
    - (d) Pigment
  - (2) Abnormal components
    - (a) Glucose
    - (b) Albumin
    - (c) Blood
    - (d) Ketones/acetone
    - (e) Plasma proteins
    - (f) Bacterial/pus cells
    - (g) Casts
    - (h) Crystals

## **XVII. Reproductive system**

- A. Structures and functions of the female reproductive system
  - 1. External
    - a. Vulva
    - b. Labia
      - (1) Majora
      - (2) Minora
    - c. Clitoris
    - d. Vestibule
      - (1) Distal urethral meatus
      - (2) Introitus
    - e. Perineum
  - 2. Internal
    - a. Vagina
    - b. Glands
      - (1) Bartholin's glands
      - (2) Skene's glands
    - c. Ovaries
      - (1) Ovarian ligament
      - (2) Oocyte formation
      - (3) Hormone production

- (a) Estrogen
      - (b) Progesterone
    - d. Fallopian tubes
    - e. Uterus
      - (1) Fundus
      - (2) Corpus
      - (3) Cervix
      - (4) Endometrium
      - (5) Myometrium
      - (6) Perimetrium
      - (7) Visceral peritoneum
      - (8) Ligaments
        - (a) Round
        - (b) Broad
        - (c) Cardinal
        - (d) Uterosacral
  - 3. Breast
    - a. Mammary glands
    - b. Mammary ducts
    - c. Areola/nipple
- B. Menstrual cycle
  - 1. Proliferative phase
  - 2. Ovulation
  - 3. Progestational phase
  - 4. Menstrual phase
    - a. Terminology related to pregnancy
      - (1) Abortion
        - (a) Spontaneous
        - (b) Induced
      - (2) Amnion
      - (3) Chorion
      - (4) Embryo
      - (5) Fertilization
      - (6) Fetus
      - (7) Gestation
      - (8) Gravity
      - (9) Implantation
      - (10) Parity
      - (11) Placenta
      - (12) Premature
- C. Structures and functions of the male reproduction system
  - 1. External
    - a. Scrotum
    - b. Penis
      - (1) Shaft
        - (a) Urethra



- 1) Internal
        - 2) Meatus
      - (b) Corpus cavernosum
      - (c) Corpus spongiosum
    - (2) Distal penis
      - (a) Glans penis
      - (b) Prepuce/foreskin
  - 2. Internal
    - a. Testes
      - (1) Seminiferous tubules
      - (2) Tunica vaginalis
      - (3) Testosterone production
      - (4) Spermatogenesis
    - b. Epididymis
    - c. Inguinal canal
    - d. Spermatic cord
    - e. Vastus ductus deferens
    - f. Ejaculatory duct
    - g. Seminal vesicles
    - h. Prostate
    - i. Bulbourethral gland/Cowper's gland
- D. Terminology related to male reproduction
  - 1. Ejaculation
  - 2. Erection
  - 3. Flaccid
  - 4. Impotence
  - 5. Retrograde ejaculation
  - 6. Semen
- XVIII. Endocrine system**
- A. Pituitary gland (hypophysis)
    - 1. Structure
      - a. Anterior lobe/adenohypophysis
      - b. Posterior lobe/neurohypophysis
    - 2. Functions
      - a. Adrenocorticotrophic hormone (ACTH)
      - b. Antidiuretic hormone (ADH)
      - c. Follicle-stimulating hormone (FSH)
      - d. Growth hormone (GH)
      - e. Luteinizing hormone (LH)
      - f. Oxytocin (OXT)
      - g. Production of neural transmitter
      - h. Prolactin (PRL)
      - i. Thyroid-stimulating hormone (TSH)
      - j. Trophic hormone transmitter production
      - k. Vasopressin (VP)
  - B. Pineal gland

1. Structure
    - a. Posterior to pituitary gland
  2. Functions
    - a. Melatonin
      - (1) Synthesize
      - (2) Secrete
- C. Thyroid gland**
1. Structure
    - a. Right lobe
    - b. Isthmus
    - c. Left lobe
  2. Functions
    - a. Regulation of body metabolism
    - b. Production of hormones
      - (1) Thyroxine (T<sub>4</sub>)
      - (2) Calcitonin
- D. Parathyroid glands**
1. Structure
    - a. 4-6 glands
  2. Functions
    - a. Production of parathyroid hormone (PTH)
      - (1) Parathormone
- E. Adrenal/suprarenal glands**
1. Structure
    - a. Medulla
      - (1) Chromaffin cell
    - b. Cortex
  2. Functions
    - a. Production/secretion of hormones
      - (1) Glucocorticoids
      - (2) Mineralocorticoids
      - (3) Androgens
      - (4) Catecholamines
- F. Pancreas: Islets of Langerhans**
1. Structure
  2. Functions
    - a. Production/secretion of hormones
      - (1) Insulin
      - (2) Glucagon
      - (3) Somatostatin

- G.** Thymus
  - 1.** Structure
    - a.** Mediastinum
  - 2.** Functions
    - a.** Production/secretion of hormones
      - (1)** Thymosin

## PHARMACOLOGY AND ANESTHESIA

**Objectives:** The learner will:

1. Analyze the principles of anesthesia administration as well as be able to explain the necessity of each component of anesthesia preparation of the surgical patient.
2. Compare and contrast methods, agents, and techniques of anesthesia administration and preparation.
3. Correlate anesthesia monitoring devices with patient homeostasis.
4. Explain anesthesia complications and interventions.
5. Calculate medication conversions and dosages.
6. Apply general terminology to medication use.
7. Prepare and manage medications and solutions.
8. Use medications in the care of the surgical patient.

**Content:**

- I. Definition of anesthesia
- II. Assessment to determine anesthesia choice
  - A. American Society of Anesthesiologists determination
  - B. Patient factors
    1. Age
    2. Height
    3. Weight
    4. General health
    5. Co-morbid conditions
      - a. Diabetes
      - b. Blood pressure
      - c. Heart disease
    6. Current medications
    7. Allergies
    8. Substance abuse
    9. Emergency conditions
    10. Patient's psychological state
  - C. Type of procedure
    1. Duration
    2. Surgical position
  - D. Surgeon's preference
  - E. Patient's preference
  - F. Anesthesia provider's preference
  - G. Choices of anesthesia administration
    1. General
      - a. Intravenous
      - b. Inhalation
    2. Regional
      - a. Spinal
      - (1) Intrathecal

- b. Epidural
    - c. Caudal
    - d. Rectal
    - e. Nerve block (local)
      - (1) Intramuscular
      - (2) Topical
    - f. Bier block
      - (1) Infiltration
  - 3. Related terms
    - a. Balanced anesthesia
    - b. Neuroleptanalgesia
    - c. Neuroleptanesthesia
    - d. Monitored anesthesia care (MAC)
- III. Surgical team roles during administration
  - A. Health care facility policy
  - B. Assisting anesthesia personnel
    - 1. General anesthesia
    - 2. Spinal/epidural anesthesia
    - 3. Regional anesthesia
    - 4. Local anesthesia
  - C. Dispensing medications
  - D. Monitoring
  - E. Documenting
- IV. Preoperative medication of the patient
  - A. Sedative-hypnotic agents
    - 1. Diazepam
    - 2. Lorazepam
    - 3. Midazolam
  - B. Analgesics
    - 1. Natural opoid
      - a. Morphine
    - 2. Synthetic opioids
      - a. Meperidine
      - b. Fentanyl
      - c. Sufentanil
      - d. Alfentanil
      - e. Remifentanil
  - C. Anti-cholinergics
    - 1. Atropine
    - 2. Glycopyrrolate
    - 3. Scopolamine
  - D. Antacid/H<sub>2</sub>-receptor blocking agents
    - 1. Sodium citrate with citric acid
    - 2. Cimetidine
    - 3. Famotidine
    - 4. Ranitidine

- E. Antiemetics
  - 1. Promethazine
  - 2. Ondansetron
  - 3. Metoclopramide
- V. General anesthesia
  - A. Patient position for induction
    - 1. Supine
  - B. Patient monitoring devices
    - 1. Electrocardiogram (ECG)
      - a. Principles
      - b. Equipment
      - c. Placement of electrodes (sites)
      - d. Recording
      - e. Values
        - (1) Adult
        - (2) Child
    - 2. Blood pressure
      - a. Principles
      - b. Equipment
        - (1) Stethoscope and cuff
        - (2) Automated cuff
      - c. Techniques
      - d. Sites
      - e. Recording
      - f. Values
        - (1) Normal
        - (2) Abnormal
    - 3. Pulse
      - a. Principles
      - b. Equipment
      - c. Techniques
        - (1) Manual
        - (2) Pulse oximeter (See #7)
      - d. Sites
      - e. Recording
      - f. Values
        - (1) Normal
        - (2) Abnormal
    - 4. Bispectral index monitor (BIS)
    - 5. Intravascular catheters
      - a. Arterial line
        - (1) Principles
        - (2) Equipment
        - (3) Techniques
        - (4) Recording

- (5) Values
- b. Swan-Ganz pulmonary artery catheter
    - (1) Principles
    - (2) Equipment
    - (3) Techniques
    - (4) Recording
    - (5) Values
  - c. Central venous pressure
    - (1) Principles
    - (2) Equipment
    - (3) Techniques
    - (4) Recording
    - (5) Values
- 6. Temperature
  - a. Principles
  - b. Equipment
    - (1) Probe
      - (a) Rectal
    - (2) Foley temperature catheter
    - (3) Skin temperature strip
  - c. Techniques
  - d. Sites
  - e. Recording
  - f. Values
    - (1) Normal
    - (2) Abnormal
- 7. Pulse oximeter
  - a. Principles
  - b. Equipment
  - c. Techniques
  - d. Values
    - (1) Normal
    - (2) Abnormal
- 8. Capnography
- 9. Respiration
  - a. Principles
  - b. Techniques
    - (1) Manual
  - c. Recording
  - d. Values
    - (1) Normal
    - (2) Abnormal
- 10. System for anesthetic and respiratory analysis (SARA)
- 11. Doppler

12. Arterial blood gases
  - a. Principles
  - b. Equipment
  - c. Techniques
  - d. Lab values
- C. Related patient care devices
  1. Hypo- and hyperthermia unit
    - a. Principles
    - b. Equipment
    - c. Techniques
    - d. Temperature
  2. Fluid warming devices
  3. Fluid pump
  4. Infusion control devices
  5. Double-cuffed pneumatic tourniquet
- D. Anesthesia machine
  1. Vaporizer
  2. Ventilator
  3. Re-breathing apparatus
  4. Scavenging system
- E. Methods for delivering inhalation general anesthesia
  1. Mask
  2. Laryngeal mask airway
  3. Endotracheal intubation
- F. Intubation and extubation assistive devices
  1. Laryngoscope
    - a. Rigid
    - b. Flexible
  2. McGill forceps
  3. Stylet
  4. Oral airway
  5. Nasal airway
  6. Nerve stimulator
- G. Phases of general anesthesia
  1. Induction
  2. Maintenance
  3. Emergence
  4. Recovery
- H. Stages of general anesthesia
  1. Stage 1
  2. Stage 2
  3. Stage 3
  4. Stage 4
- I. Anesthetic agents
  1. Inhalation
    - a. Oxygen



- b. Nitrous oxide
  - c. Isoflurane
  - d. Desflurane
  - e. Sevoflurane
- 2. Intravenous
  - a. Benzodiazepines (See IV, a list of sedative-hypnotic agents)
  - b. Thiopental
  - c. Methohexital
  - d. Propofol
  - e. Etomidate
  - f. Dissociative agent
    - (1) Ketamine
- 3. Neuromuscular blocking agents
  - a. Depolarizing
    - (1) Succinylcholine
  - b. Non-depolarizing
    - (1) Atracurium
    - (2) Rocuronium
    - (3) Vecuronium
    - (4) Pancuronium
- 4. Neuromuscular blocking reversal agents for non-depolarizing agents
  - a. Edrophonium
  - b. Neostigmine
- 5. Neuroleptic agents
  - a. Droperidol
- 6. Antagonistic agents
  - a. Agents that reverse opioid analgesic agents
    - (1) Naloxone
    - (2) Nalmefene
    - (3) Naltrexone
  - b. Agent that reverses benzodiazepines
    - (1) Flumazenil

## VI. Local anesthesia

- A. Delivery methods
  - 1. Injection
  - 2. Topical
- B. Local and topical agents
  - 1. Amides
    - a. Lidocaine
    - b. Bupivacaine
    - c. Mepivacaine
  - 2. Esters
    - a. Cocaine
    - b. Pontocaine

- c. Tetracaine
  - d. Cetacaine
- VII. Complications of anesthesia**
  - A. Allergic reaction
  - B. Aspiration
    - 1. Sellick's maneuver
  - C. Laryngospasm
  - D. Bronchospasm
  - E. Malignant hyperthermia
  - F. Shock
    - 1. Hemorrhagic
    - 2. Cardiogenic
  - G. Cardiac dysrhythmias
  - H. Cardiac arrest
- VIII. Alternative anesthesia methods**
  - A. Cryoanesthesia
  - B. Acupuncture
- IX. Medication measurements**
  - A. Conversion and equivalent tables
    - 1. Metric system
      - a. Terminology
      - b. Conversions
    - 2. Household system
      - a. Terminology
      - b. Conversions
    - 3. Temperature conversion
      - a. Fahrenheit to Celsius
      - b. Celsius to Fahrenheit
    - 4. Units of measure
      - a. oz
      - b. mL or ml
      - c. L
      - d. Gtt
      - e. Kg
      - f. Mg
  - B. Basic mathematics
    - 1. Fractions
    - 2. Decimals (see Information Box)
    - 3. Ratios
    - 4. Proportions
    - 5. Percentages
  - C. Dosage calculations
    - 1. Calculating unit per milliliter dosages
    - 2. Calculating amount/dosage delivered

According to The Joint Commission's "Do Not Use" abbreviation list, trailing or leading zero should not be used. Refer to "Medical Terminology," IV, B.

- D. Mixing medications
      - 1. Combining
      - 2. Reconstituting
      - 3. Diluting
- X. Terminology
  - A. General definitions
    - 1. Pharmacology
    - 2. Pharmacokinetics
      - a. Absorption
      - b. Distribution
      - c. Metabolism
      - d. Excretion
    - 3. Pharmacodynamics
      - a. Onset
      - b. Peak affect
      - c. Duration of action
  - B. Types of medication actions and effects
    - 1. Actions
      - a. Synergist
      - b. Agonist
      - c. Antagonist
      - d. Additive
    - 2. Therapeutic actions
      - a. Indications
      - b. Contraindications
    - 3. Effects
      - a. Side effects
      - b. Adverse effects
- XI. Medications
  - A. Medication nomenclature
    - 1. Chemical name
    - 2. Generic name
    - 3. Trade or brand name
  - B. Medication classifications
    - 1. Controlled substance (Schedule I-V)
    - 2. Prescription medications
    - 3. Nonprescription medications – over the counter
    - 4. Alternative medications
  - C. Medication/solution violations
    - 1. Narcotic precautions
    - 2. Personnel negligence
    - 3. Consequences to patient

- D.** Laws, policies and procedures
  - 1. Healthcare facility policies and procedures
  - 2. State and federal laws
  - 3. Types of medication orders
    - a. Standing (e.g. surgeon's preference card)
    - b. Stat
    - c. Verbal
    - d. PRN
- E.** Medication publications
  - 1. *Physician's Desk Reference*
  - 2. *The National Formulary*
  - 3. *Pharmacopodia of the United States of America*
  - 4. *American Hospital Formulary Service Index*
  - 5. The Joint Commission National Patient Safety Goals
- F.** Sources of medications
  - 1. Plants
  - 2. Animals
  - 3. Minerals
  - 4. Laboratory synthesis
  - 5. Biotechnology
- G.** Drug forms
  - 1. Gas
  - 2. Liquid
    - a. Solution
    - b. Suspension
    - c. Emulsion
  - 3. Solid
  - 4. Semisolid
- H.** Routes of administration
  - 1. Injection/parenteral
    - a. IV
    - b. IM
    - c. SC
    - d. Intraarticular
    - e. Intrathecal
    - f. Intracardiac
  - 2. Instillation
  - 3. Enteral
  - 4. PO
  - 5. Inhalation
  - 6. Topical application

- XII.** Care and handling of medications and solutions
  - A.** Medication identification
    - 1. Label information
    - 2. Trade name
    - 3. Generic name
    - 4. Concentration
    - 5. Amount
    - 6. Expiration date
    - 7. Directions for reconstitution/dilution
    - 8. Storage
      - a. Handling precautions
      - b. Warnings
    - 9. Route of administration
  - B.** Packaging, measurement and delivery
    - 1. Syringes
      - a. Slip-tip
      - b. Leur-lock
    - 2. Finger control
      - a. Preloaded syringes
      - b. Tubex
      - c. Irrigating
        - (1) Ear syringe
        - (2) Asepto
        - (3) Toomey
        - (4) Catheter tip
    - 3. Vial
    - 4. Ampule
    - 5. Tube
    - 6. Sterile packets
    - 7. Metal containers
    - 8. Graduated pitcher
    - 9. Plastic containers
    - 10. Intrathecal pump
  - C.** Medication preparation
    - 1. Nonsterile area
      - a. Draw up medication into syringe
    - 2. Transfer of medication(s) to the sterile field
      - a. Circulator responsibility and role
      - b. Surgical technologist responsibility and role
      - c. Methods of transfer
    - 3. Techniques of identification
      - a. Labeling devices
      - b. Containers on sterile field
      - c. Six rights
      - d. Verification

### **XIII. Medications used in surgery (See Information Box)**

#### **A. Classification of agents**

- 1.** Analgesics
- 2.** Analgesic antipyretic agents
- 3.** Anticoagulants and fibrinolytics
- 4.** Anticonvulsants
- 5.** Antiemetics and antihistamines
- 6.** Anti-infective agents
  - a.** Aminoglycoside
  - b.** Antifungals
  - c.** Antimicrobial
  - d.** Penicillins and cephalosporins
  - e.** Polymyxins
  - f.** Sulfonamides
  - g.** Tetracyclines
- 7.** Antineoplastic chemotherapy
- 8.** Autonomic agents
  - a.** Adrenergics (alpha and beta)
  - b.** Adrenergic blockers
  - c.** Cholinergics
  - d.** Cholinergic blockers
- 9.** Blood replacement interventions
  - a.** Autologous blood
    - (1)** Autotransfusion
      - (a)** Principles
      - (b)** Techniques
  - b.** Donated blood products
    - (1)** Type-and-cross matching
    - (2)** Component therapy
      - (a)** Principles
  - c.** Whole blood
    - (1)** Principles
  - d.** Plasma expanders
    - (1)** Medication
    - (2)** Infusion
- 10.** Cardiac medication
  - a.** Antiarrhythmics
  - b.** Coronary dilators
  - c.** Inotropic agents
- 11.** Central nervous system stimulants
  - a.** Analeptics
  - b.** Emetics
  - c.** Neuroleptics
- 12.** Coagulants and hemostatics
- 13.** Contrast media

Several classes of agents are repeated in this section for purposes of continuity. Refer to IV and V, I to cross reference.

14. Diuretics
15. Dyes
16. Emergency drugs
  - a. Malignant hyperthermia
  - b. Cardiac arrest
  - c. Respiratory arrest
17. Gastric medication
  - a. H2-receptor blockers
18. Hormones
  - a. Corticosteroids
  - b. Insulin/glucagon
  - c. Prostaglandins
  - d. Sex hormones
19. Inhalation
  - a. Nasal sprays
  - b. Respiratory inhalers
20. Irrigation solutions
21. IV fluids
22. Narcotics
23. Narcotic antagonists
24. Obstetrical agents
  - a. Oxytocics
  - b. RhoGAM
25. Ophthalmic medications
  - a. Antibiotics
  - b. Dyes and stains
  - c. Enzymes
    - (1) Zonulysis
  - d. Irrigating solutions
  - e. Local anesthesia adjuncts
  - f. Lubricants
  - g. Miotics
  - h. Mydriatics
  - i. Viscoelastics
26. Sedative-hypnotic agents
27. Staining agents
28. Tranquilizers
- B. Alternative medications
  1. Herbal medicine
  2. Nutritional supplements

## MEDICAL TERMINOLOGY

**Objectives:** The learner will:

1. Combine prefixes, word roots, and suffixes to create medical terms related to surgery.
2. Construct and combine compound words.
3. Pronounce medical terms related to surgery.
4. Write medical terms using correct spelling.

**Content:**

- I. Rules for combining forms
  - A. Combining word parts
  - B. Compound words
  - C. Plural forms
- II. Prefix, Suffix, Direction, Amount, and Color
  - A. Prefix
    1. A-
    2. Ab-
    3. Ad-
    4. An-
    5. Ante-
    6. Anti-
    7. Brady-
    8. Contra-
    9. Crypt-
    10. Dia-
    11. Dys-
    12. Ecto-
    13. En-
    14. Endo-
    15. Epi-
    16. Eu-
    17. Ex-
    18. Exo-
    19. Hemi-
    20. Hyper-
    21. Hypo-
    22. Inter-
    23. Intra-
    24. Mal-
    25. Para-
    26. Per-
    27. Peri-
    28. Post-
    29. Pre-
    30. Retro-



- 31. Semi-
- 32. Sub-
- 33. Super-
- 34. Supra-
- 35. Tachy-
- B. Suffix
  - 1. -Al
  - 2. -Algia
  - 3. -Cele
  - 4. -Centesis
  - 5. -Ectasia
  - 6. -Ectasis
  - 7. -Ectomy
  - 8. -Edema
  - 9. -Emesis
  - 10. -Gram
  - 11. -Graph
  - 12. -Graphy
  - 13. -Ia
  - 14. -Iasis
  - 15. -Ism
  - 16. -Ist
  - 17. -Itis
  - 18. -Ium
  - 19. -Logist
  - 20. -Logy
  - 21. -Lysis
  - 22. -Malacia
  - 23. -Megaly
  - 24. -Oid
  - 25. -Oma
  - 26. -Osis
  - 27. -Pathy
  - 28. -Pexy
  - 29. -Plasty
  - 30. -Ptosis
  - 31. -Rrhage
  - 32. -Rrhagia
  - 33. -Rrhaphy
  - 34. -Rrhea
  - 35. -Sclerosis
  - 36. -Scope
  - 37. -Scopy
  - 38. -Sis
  - 39. -Spasm
  - 40. -Stasis

- 41. -Stomy
- 42. -Tome
- 43. -Tomy
- 44. -Tripsy

**C. Word roots/combining forms**

- 1. Forms describing planes and direction of reference
  - a. Anter/o
  - b. Caud/o
  - c. Cephal/o
  - d. Central
  - e. Dist/o
  - f. Dors/o
  - g. Extern/o
  - h. Infer/o
  - i. Intern/o
  - j. Later/o
  - k. Medi/o
  - l. Pariet/o
  - m. Peripher/o
  - n. Poster/o
  - o. Proxim/o
  - p. Super/o
  - q. Ventr/o
  - r. Viscer/o
- 2. Forms describing amount or number
  - a. Bi-
  - b. Di-
  - c. Mono-
  - d. Multi-
  - e. Nulli-
  - f. Poly-
  - g. Primi-
  - h. Quad-
  - i. Quadra-
  - j. Tetra-
  - k. Tri-
  - l. Uni-
- 3. Forms describing color or description
  - a. Chlor/o
  - b. Cyan/o
  - c. Erythr/o
  - d. Melan/o
  - e. Xanth/o

**III. Medical term components by system**

**A. Integumentary system**

**1. Word roots**

- a.** Adip/o
- b.** Caus/o
- c.** Cauter/o
- d.** Cutane/o
- e.** Derm/o
- f.** Dermat/o
- g.** Diaphor/o
- h.** Erythem/o
- i.** Erythemat/o
- j.** Hydr/o
- k.** Kerat/o
- l.** Leuk/o
- m.** Lip/o
- n.** Melan/o
- o.** Myc/o
- p.** Onych/o
- q.** Phyt/o
- r.** Pil/o
- s.** Py/o
- t.** Seb/o
- u.** Sebace/o
- v.** Squam/o
- w.** Steat/o
- x.** Trich/o
- y.** Ungu/o
- z.** Xer/o

**B. Musculoskeletal system**

**1. Word roots**

- a.** Ankyl/o
- b.** Arthr/o
- c.** Burs/o
- d.** Calc/o
- e.** Carp/o
- f.** Cervic/o
- g.** Chondr/o
- h.** Clavicl/o
- i.** Coccyg/o
- j.** Cost/o
- k.** Crani/o
- l.** Femor/o
- m.** Fibul/o
- n.** Humer/o
- o.** Ili/o

<b>p.</b>	Ischi/o
<b>q.</b>	Lumb/o
<b>r.</b>	Metacarp/o
<b>s.</b>	Metatars/o
<b>t.</b>	Musculo/o
<b>u.</b>	My/o
<b>v.</b>	Myel/o
<b>w.</b>	Oste/o
<b>x.</b>	Patell/o
<b>y.</b>	Pelv/i
<b>z.</b>	Phalang/o
<b>aa.</b>	Pub/o
<b>bb.</b>	Pubic
<b>cc.</b>	radi/o
<b>dd.</b>	Sacr/o
<b>ee.</b>	Scapul/o
<b>ff.</b>	Spondyl/o
<b>gg.</b>	Stern/o
<b>hh.</b>	Tars/o
<b>ii.</b>	Ten/o
<b>jj.</b>	Tend/o
<b>kk.</b>	Thorac/o
<b>ll.</b>	Tibi/o
<b>mm.</b>	Uln/o
<b>nn.</b>	Vertbr/o

**C.** Nervous system

<b>1.</b>	Word roots
<b>a.</b>	Alges/o
<b>b.</b>	Angi/o
<b>c.</b>	Caus/o
<b>d.</b>	Cerebell/o
<b>e.</b>	Cerebr/o
<b>f.</b>	Comat/o
<b>g.</b>	Crani/o
<b>h.</b>	Cry/o
<b>i.</b>	Dur/o
<b>j.</b>	Encephal/o
<b>k.</b>	Gli/o
<b>l.</b>	Hydr/o
<b>m.</b>	Mening/o
<b>n.</b>	Meningi/o
<b>o.</b>	My/o
<b>p.</b>	Myel/o
<b>q.</b>	Narc/o
<b>r.</b>	Neur/o
<b>s.</b>	Pont/o

- t.** Radicul/o
- u.** Spin/o
- v.** Syncop/o
- w.** Tax/o
- x.** Thalam/o
- y.** Troph/o
- z.** Vag/o

**D.** Sensory system

**1.** Eye

**a.** Word roots

- (1)** Aque/o
- (2)** Ambly/o
- (3)** Blephar/o
- (4)** Conjunctiv/o
- (5)** Cor/o
- (6)** Corne/o
- (7)** Cycl/o
- (8)** Dacry/o
- (9)** Dipl/o
- (10)** Glauco/o
- (11)** Ir/o
- (12)** Irid/o
- (13)** Kerat/o
- (14)** Lacrim/o
- (15)** Mi/o
- (16)** Mydr/o
- (17)** Ocul/o
- (18)** Ophthalm/o
- (19)** Opt/o
- (20)** Optic/o
- (21)** Palpebr/o
- (22)** Papill/o
- (23)** Phac/o
- (24)** Phot/o
- (25)** Presby/o
- (26)** Pupill/o
- (27)** Retin/o
- (28)** Scler/o
- (29)** Uve/o
- (30)** Vitre/o
- (31)** Xer/o

**b.** Suffixes

- (1)** -opia
- (2)** -opsia
- (3)** -tropia

- 2. Ear**
- a. Word roots**
- (1) Acous/o
  - (2) Audi/o
  - (3) Aur/o
  - (4) Auricul/o
  - (5) Cochle/o
  - (6) Mastoid/o
  - (7) Myring/o
  - (8) Ossicul/o
  - (9) Ot/o
  - (10) Staped/o
  - (11) Tympan/o
- b. Suffixes**
- (1) -cusis
  - (2) -otia

**E. Circulatory system - blood**

- 1. Word roots**
- a.** Agglutin/o
  - b.** Bas/o
  - c.** Chrom/o
  - d.** Coagul/o
  - e.** Cyt/o
  - f.** Eosin/o
  - g.** Erythr/o
  - h.** Granul/o
  - i.** Hem/o
  - j.** Hemat/o
  - k.** Hemoglobin/o
  - l.** Leuk/o
  - m.** Mon/o
  - n.** Morph/o
  - o.** Neutr/o
  - p.** Nucle/o
  - q.** Phag/o
  - r.** Thromb/o
- 2. Suffixes**
- a.** -apheresis
  - b.** -blast
  - c.** -cytosis
  - d.** -emia
  - e.** -globin
  - f.** -globulin
  - g.** -lytic
  - h.** -phoresis

- i.     -plasia
  - j.     -poesis
- F.    Cardiovascular system
  - 1.    Word roots
    - a.    Aneurysm/o
    - b.    Angi/o
    - c.    Aort/o
    - d.    Arter/o
    - e.    Arteri/o
    - f.    Ather/o
    - g.    Atri/o
    - h.    Cardi/o
    - i.    Coron/o
    - j.    Cyan/o
    - k.    Isch/o
    - l.    Lymph/o
    - m.    Lymphat/o
    - n.    My/o
    - o.    Pericardi/o
    - p.    Phleb/o
    - q.    Sphygm/o
    - r.    Valv/o
    - s.    Vas/o
    - t.    Ven/o
    - u.    Ventricul/o
- G.    Lymphatic system
  - 1.    Word roots
    - a.    Cervic/o
    - b.    Immun/o
    - c.    Lymph/o
    - d.    Lymphaden/o
    - e.    Lymphangi/o
    - f.    Splen/o
    - g.    Thym/o
- H.    Respiratory system
  - 1.    Word roots
    - a.    Alveol/o
    - b.    Bronch/o
    - c.    Bronchi/o
    - d.    Bronchiol/o
    - e.    Laryng/o
    - f.    Lob/o
    - g.    Nas/o
    - h.    Ox/o
    - i.    Pharyng/o
    - j.    Phren/o

- k. Pleur/o
    - l. Pneum/o
    - m. Pneumon/o
    - n. Pulm/o
    - o. Pulmon/o
    - p. Rhin/o
    - q. Thorac/o
    - r. Trache/o
  - 2. Suffixes
    - a. -ole
    - b. -pnea
- I. Digestive system
  - 1. Word roots
    - a. Abdomin/o
    - b. An/o
    - c. Append/o
    - d. Appendic/o
    - e. Bil/i
    - f. Cec/o
    - g. Chol/e
    - h. Cholecyst/o
    - i. Col/o
    - j. Colon/o
    - k. Dent/i
    - l. Dent/o
    - m. Doch/o
    - n. Duoden/o
    - o. Enter/o
    - p. Esopha/o
    - q. Gastr/o
    - r. Gingiv/o
    - s. Gloss/o
    - t. Hepat/o
    - u. Ile/o
    - v. Intestin/o
    - w. Jejun/o
    - x. Lapar/o
    - y. Lingu/o
    - z. Odont/o
    - aa. Omphal/o
    - bb. Or/o
    - cc. Pancreat/o
    - dd. Periton/o
    - ee. Proct/o
    - ff. Rect/o
    - gg. Sial/o



- hh. Sigmoid/o
    - ii. Stomat/o
  - J. Genitourinary
    - 1. Word roots
      - a. Albumin/o
      - b. Cyst/o
      - c. Glomerul/o
      - d. Hydr/o
      - e. Lith/o
      - f. Olig/o
      - g. Pyel/o
      - h. Ren/o
      - i. Trigon/o
      - j. Ureter/o
      - k. Urethr/o
      - l. Urin/o
      - m. Vesic/o
  - K. Reproductive system
    - 1. Female reproductive system
      - a. Word roots
        - (1) Amni/o
        - (2) Cervic/o
        - (3) Colp/o
        - (4) Culd/o
        - (5) Fet/o
        - (6) Gon/o
        - (7) Gynec/o
        - (8) Hyster/o
        - (9) Lapar/o
        - (10) Mamm/o
        - (11) Mast/o
        - (12) Men/o
        - (13) Metr/o
        - (14) Myom/o
        - (15) Nat/i
        - (16) Oophor/o
        - (17) Ovar/o
        - (18) Par/o
        - (19) Salping/o
        - (20) Uter/o
        - (21) Vagin/o
        - (22) Vulv/o
    - 2. Male reproductive system
      - a. Word roots
        - (1) Epididym/o
        - (2) Genit/o

- (3) Orchi/o
- (4) Orchid/o
- (5) Pen/o
- (6) Prostat/o
- (7) Scrot/o
- (8) Semin/o
- (9) Spermat/o
- (10) Test/o
- (11) Testic/o
- (12) Varic/o
- (13) Vas/o

**L. Endocrine system**

**1. Word roots**

- a.** Aden/o
- b.** Adren/o
- c.** Adrenal/o
- d.** Calc/o
- e.** Cortic/o
- f.** Crin/o
- g.** Estr/o
- h.** Gluc/o
- i.** Glyc/o
- j.** Home/o
- k.** Kal/i
- l.** Pancreat/o
- m.** Parathyroid/o
- n.** Pituitar/o
- o.** Thyr/o
- p.** Thyroid/o

**IV. Abbreviations**

**A. Commonly used abbreviations**

- 1.** ABG arterial blood gas
- 2.** ACLS advanced cardiac life support
- 3.** AD right ear
- 4.** AF atrial fibrillation
- 5.** AIDS acquired immunodeficiency syndrome
- 6.** AK above the knee
- 7.** A/P anterior-posterior
- 8.** ARD acute respiratory disease
- 9.** AS left ear
- 10.** ASD atrial septal defect
- 11.** A/V atrioventricular
- 12.** BCLS basic cardiac life support
- 13.** b.i.d. twice a day
- 14.** BK below the knee
- 15.** BP blood pressure

- 16. BPH benign prostatic hypertrophy
- 17. BSA body surface area
- 18. BUN blood urea nitrogen
- 19. Bx biopsy
- 20. Ca cancer
- 21. CABG cardiac artery bypass graft
- 22. CAD coronary artery disease
- 23. CAT computed axial tomography
- 24. CBC complete blood count
- 25. CHF congestive heart failure
- 26. CNS central nervous system
- 27. COPD chronic obstructive pulmonary disease
- 28. CPR cardiopulmonary resuscitation
- 29. CSF cerebrospinal fluid
- 30. CVA cerebrovascular accident
- 31. CVP central venous pressure
- 32. D & C dilation (dilatation) and curettage
- 33. D/C discontinue
- 34. DIC disseminated intravascular coagulation
- 35. DJD degenerative joint disease
- 36. DNR do not resuscitate
- 37. DX diagnosis
- 38. ECG (EKG) electrocardiogram; electrocardiograph
- 39. EEG electroencephalogram; electroencephalograph
- 40. ENT ear, nose and throat
- 41. Fx fracture
- 42. GERD gastroesophageal reflux disease
- 43. gm gram
- 44. GSW gunshot wound
- 45. gt (gtt) drop
- 46. GU genitourinary
- 47. GYN gynecology
- 48. H & P history & physical
- 49. HBV hepatitis B virus
- 50. HCT hematocrit
- 51. HIV human immunodeficiency virus
- 52. I & D incision & drainage
- 53. ICP intracranial pressure
- 54. ICU intensive care unit
- 55. IM intramuscular
- 56. IOP intraocular pressure
- 57. IV intravenous
- 58. KUB kidney, ureter, bladder
- 59. L & D labor and delivery
- 60. LLQ left lower quadrant
- 61. LUQ left upper quadrant

62.	MRI	magnetic resonance imaging
63.	NKA	no known allergies
64.	NPO (n.p.o.)	nothing by mouth
65.	NS	normal saline
66.	OD	right eye
67.	OS	left eye
68.	OU	both eyes
69.	P/A	posterior-anterior
70.	PAD	peripheral artery disease
71.	PACU	post-anesthesia care unit
72.	PDA	patent ductus arteriosus
73.	PET	positron emission tomography
74.	PID	pelvic inflammatory disease
75.	PRN	as needed
76.	PVC	premature ventricular contraction
77.	RBC	red blood cell
78.	RLQ	right lower quadrant
79.	ROM	range of motion
80.	RUQ	right upper quadrant
81.	RX	drug prescription
82.	stat	immediately
83.	STD	sexually transmitted disease
84.	TAH/BSO	total abdominal hysterectomy with bilateral salpingo-oophorectomy
85.	T & A	tonsillectomy & adenoidectomy
86.	TB	tuberculosis
87.	TENS	transcutaneous electrical nerve stimulation
88.	TIA	transient ischemic attack
89.	t.i.d.	three times a day
90.	TMJ	temporomandibular joint
91.	TPR	temperature, pulse, respiration
92.	TURP	transurethral resection of the prostate
93.	UA (U/A)	urinalysis
94.	URI	upper respiratory infection
95.	UTI	urinary tract infection
96.	VSD	ventricular septal defect
97.	WBC	white blood cell count

**B.** The Joint Commission “Do Not Use” abbreviation list  
(<http://www.jointcommission.org/patientsafety/donotuselist/>)

**Note:** It is the responsibility of the program director to periodically review the list for updates. This list is current as of the publishing date of the *Core Curriculum for Surgical Technology*.

<u>Do Not Use</u>	<u>Use Instead</u>
U (unit)	Write “unit”
IU (international unit)	Write “international unit”
Q.D., QD, q.d., qd (daily)	Write “daily”
Q.O.D., QOD, q.o.d., qod (every other day)	Write “every other day”
Trailing zero (X.0 mg)	Write X mg
Lack of leading zero (.X mg)	Write 0.X mg
MS	Write “morphine sulfate”
MSO <sub>4</sub> and MgSO <sub>4</sub>	Write “magnesium sulfate”

**C.** The Joint Commission abbreviations for possible future inclusion on “Do Not Use” list

<u>Do Not Use</u>	<u>Use Instead</u>
> (greater than)	Write “greater than”
< (less than)	Write “less than”
Abbreviations for drug names	Write drug names in full
Apothecary units	Use metric units
@	Write “at”
cc	Write “mL”, “ml” or “milliliters”
µg	Write “mcg” or “micrograms”

## MICROBIOLOGY

**Objectives:** The learner will:

1. Correlate the impact of microbiology in relationship to the practice of sterile technique and infection control in the operative setting.
2. Identify the name and function of various parts of the compound microscope.
3. Compare and contrast the structure and characteristics of different microorganisms.
4. Analyze the various immune responses that occur in the body as defenses against invasion by pathogens.
5. Relate the infectious process to surgical practice.

**Content:**

- I. Introduction to microbiology
  - A. History of microbiology
  - B. Microbiology today
  - C. Basic chemistry of life
- II. Cell (see Information Box)
  - A. Classification
    1. Eukaryotic
    2. Prokaryotic
  - B. Structure of eukaryotic cells
  - C. Structure of prokaryotic cells
    1. Capsule
    2. Slime layer
    3. Cell wall
    4. Cytoplasmic membrane
    5. Cytoplasm
      - a. Ectoplasm
      - b. Endoplasm
    6. Flagella
    7. Pili and fimbriae
    8. Nucleoid
    9. Plasmids
    10. Ribosomes
  - D. Transport across the cytoplasmic membrane
    1. Passive transport
      - a. Diffusion
      - b. Osmosis
      - c. Filtration
    2. Active transport
      - a. Endocytosis
        - (1) Pinocytosis
        - (2) Phagocytosis
      - b. Exocytosis

Cells are also outlined in "Anatomy & Physiology." For purposes of continuity, the information is repeated in "Microbiology."

- III.** Introduction to microscopy
  - A.** Types of microscopes
  - B.** Parts of a microscope
  - C.** Use of a microscope
- IV.** Staining methods
  - A.** Simple stains
  - B.** Different stains
    - 1.** Gram stain
    - 2.** Acid-fast stain
    - 3.** Endospore stain
    - 4.** Capsule stain
- V.** Culture media
  - A.** General culture media
    - 1.** Defined
    - 2.** Complex
    - 3.** Selective
    - 4.** Differential
    - 5.** Anaerobic
    - 6.** Transport
  - B.** Special culture techniques
    - 1.** Cell
    - 2.** Animal
    - 3.** Low-oxygen
    - 4.** Enrichment
  - C.** Preserving cultures
- VI.** Nomenclature of microbiology
  - A.** Taxonomy
    - 1.** Species
    - 2.** Genus
    - 3.** Family
    - 4.** Order
    - 5.** Class
    - 6.** Phylum
    - 7.** Kingdoms
    - 8.** Domains
      - a.** Archaea
      - b.** Bacteria
      - c.** Eukarya
  - B.** Binomial nomenclature
- VII.** Host-microbe relationships
  - A.** Symbiosis
    - 1.** Mutualism
    - 2.** Commensalism
    - 3.** Parasitism
  - B.** Normal flora

## **VIII. Types of microorganisms**

### **A. Bacteria**

- 1. Morphology**
  - a. Cocci**
  - b. Spiral**
  - c. Bacilli**
- 2. Arrangement**
  - a. Diplococci**
  - b. Streptococci**
  - c. Staphylococci**
- 3. Endospores**
- 4. Classification**
- 5. Pathogenicity**
- 6. Growth requirements**
  - a. Nutrients**
  - b. Oxygen requirements**
  - c. Environmental requirements**
- 7. Biofilms**
- 8. Reproduction**
- 9. Healthcare concerns**
- 10. Significance**

### **B. Protozoa**

- 1. General characteristics**

### **C. Fungi**

- 1. General characteristics**

### **D. Algae**

- 1. General characteristics**

### **E. Viruses**

- 1. Morphology**
- 2. Classification**
- 3. Pathogenicity**
- 4. Environmental requirements**
- 5. Bacteriophages**
- 6. Viral replication**
  - a. Lytic**
  - b. Lysogenic**
- 7. Transmission**
- 8. Role in cancer**
- 9. Healthcare concerns**
- 10. Significance**

### **F. Viroids**

- 1. General characteristics**



- G. Prions
  - 1. Morphology
  - 2. Pathogenicity
  - 3. Environmental requirements
  - 4. Healthcare concerns
  - 5. Significance
- IX. Common causative agents
  - A. Affecting the skin and wounds
    - 1. Bacteria
      - a. *Acinetobacter*
      - b. *Bacillus anthracis*
      - c. *Clostridium perfringens*
      - d. *Pseudomonas aeruginosa*
      - e. *Rickettsia rickettsii*
      - f. *Staphylococcus aureus*
      - g. *Staphylococcus epidermidis*
      - h. *Streptococcus pyogenes*
      - i. MRSA
      - j. MRSE
      - k. VRSA
      - l. VRE
    - 2. Viruses
      - a. Cytomegalovirus
      - b. Herpes simplex virus-1 (HSV-1)
      - c. Herpes simplex virus-2 (HSV-2)
      - d. Human herpes virus 4 (HHV-4 or Epstein-Barr virus (EBV))
      - e. Human papillomavirus
      - f. Morbillivirus (measles virus)
      - g. Rubella virus
      - h. Varicella-Zoster virus
      - i. Variola virus
  - B. Affecting the nervous system
    - 1. Bacteria
      - a. *Clostridium botulinum*
      - b. *Clostridium tetani*
      - c. *Escherichia coli*
      - d. *Haemophilus influenzae*
      - e. *Klebsiella pneumoniae*
      - f. *Listeria monocytogenes*
      - g. *Mycobacterium leprae*
      - h. *Nisseria meningitides*
      - i. *Staphylococcus*
      - j. *Streptococcus agalactiae*
      - k. *Streptococcus pneumoniae*
      - l. *Streptococcus pyogenes*

2. Viruses
  - a. Enteroviruses (Polio virus)
  - b. Lyssavirus (Rabies virus)
3. Prions
  - a. New variant Creutzfeldt-Jacob Disease (nvCJD)
- C. Affecting the eyes
  1. Bacteria
    - a. *Chlamydia trachomatis*
    - b. *Haemophilus influenza*
    - c. *Neisseria gonorrhoeae*
    - d. *Staphylococcus aureus*
- D. Affecting the cardiovascular system
  1. Bacteria
    - a. Bacteroides
    - b. Bartonella
    - c. Enterococcus
    - d. *Escherichia coli*
    - e. Mycobacterium
    - f. Mycoplasma
    - g. *Neisseria meningitidis*
    - h. *Pseudomonas aeruginosa*
    - i. Salmonella
    - j. *Staphylococcus aureus*
    - k. *Staphylococcus epidermidis*
    - l. *Streptococcus pneumoniae*
    - m. *Streptococcus pyogenes*
    - n. VRE
- E. Affecting the respiratory system
  1. Bacteria
    - a. *Bacillus anthracis*
    - b. *Bordetella pertussis*
    - c. *Corynebacterium diphtheriae*
    - d. *Haemophilus influenzae*
    - e. *Klebsiella pneumoniae*
    - f. *Legionella pneumophila*
    - g. *Moraxella catarrhalis*
    - h. *Mycobacterium tuberculosis*
    - i. *Staphylococcus aureus*
    - j. *Streptococcus pneumonia*
    - k. *Streptococcus pyogenes*

2. Fungi
  - a. *Blastomyces dermatitidis*
  - b. *Coccidioides*
  - c. *Histoplasma capsulatum*
  - d. *Pneumocystis jiroveci*
- F. Affecting the digestive system
  1. Bacteria
    - a. *Clostridium difficile*
    - b. *Campylobacter jejuni*
    - c. *Escherichia coli*
    - d. *Helicobacter pylori*
    - e. *Lactobacillus*
    - f. *Porphyromonas gingivalis*
    - g. *Salmonella enterica*
    - h. *Staphylococcus aureus*
    - i. *Streptococcus mutans*
    - j. *Vibrio cholerae*
  2. Viruses
    - a. Hepatitis A (HAV)
    - b. Hepatitis B (HBV)
    - c. Hepatitis C (HCV)
    - d. Hepatitis D (HDV)
    - e. Hepatitis E (HEV)
- G. Affecting the urinary and reproductive systems
  1. Bacteria
    - a. *A Streptococcus*
    - b. *Chlamydia trachomatis*
    - c. *Escherichia coli*
    - d. *Gardnerella vaginalis*
    - e. *Klebsiella*
    - f. *Mycoplasma hominis*
    - g. *Neisseria gonorrhoeae*
    - h. *Proteus*
    - i. *Pseudomonas*
    - j. *Treponema pallidum*
  2. Viruses
    - a. HSV-1
    - b. HSV-2
    - c. Human papillomaviruses
  3. Protozoa
    - a. *Trichomonas vaginalis*
  4. Fungi
    - a. *Candida albicans*
- H. Affecting the immunological system
  1. Human immunodeficiency virus

- X. Immunology**
  - A. Innate immunology**
    - 1. First line of defense
    - 2. Second line of defense
  - B. Acquired immunity**
    - 1. Components
    - 2. Immune response
      - a. Cell-mediated
      - b. Humoral
    - 3. Types of acquired immunity
  - C. Immunization**
    - 1. Active immunization
      - a. Attenuated vaccines
      - b. Inactivated vaccines
      - c. Toxoid vaccines
      - d. Recombinant gene technology vaccines
    - 2. Passive immunization
  - D. Immune disorders**
    - 1. Hypersensitivities
      - a. Type I
      - b. Type II
      - c. Type III
      - d. Type IV
    - 2. Autoimmune diseases
      - a. Single-organ autoimmune diseases
      - b. Systemic autoimmune diseases
    - 3. Immunodeficiency diseases
      - a. Primary immunodeficiency diseases
      - b. Acquired immunodeficiency diseases
- XI. Process of infection**
  - A. Symbiotic relationships between microbes and their hosts**
    - 1. Normal microbiota
      - a. Resident
      - b. Transient
    - 2. Opportunistic pathogens
  - B. Reservoirs of infectious pathogens**
    - 1. Animal
    - 2. Human
    - 3. Non-living
  - C. Infection**
    - 1. Contamination
    - 2. Portal of entry
    - 3. Portals of exit

- 4. Modes of transmission
    - a. Direct
    - b. Indirect
  - 5. Classification of infectious disease
- D.** Nature of infectious disease
  - 1. Symptoms, signs and syndromes
  - 2. Etiology
  - 3. Virulence
  - 4. Stages of infectious disease
    - a. Incubation
    - b. Prodromal
    - c. Illness
    - d. Decline
    - e. Convalescence
- E.** Epidemiology
  - 1. Frequency of disease
  - 2. Epidemiological studies
  - 3. Health care facility epidemiology
  - 4. Public health
    - a. Epidemic
    - b. Pandemic
    - c. Endemic

## **PATHOPHYSIOLOGY**

**Objectives:** The learner will:

1. Relate pathophysiology to surgical interventions.
2. Analyze the relationship between cell pathology and disease.
3. Examine hemodynamic disorders, inflammation and infection.
4. Compare and contrast the various surgical pathologies of each body system.

**Content:**

- I. Introduction to disease
  - A. Causes of disease
    1. Etiology
    2. Pathogenesis
    3. Idiopathic
  - B. Manifestations of disease
    1. Signs
    2. Symptoms
    3. Syndrome
    4. Diagnosis
  - C. Terminology
    1. Acute
    2. Chronic
    3. Complication
    4. Exacerbation
    5. Morbidity
    6. Mortality
    7. Prognosis
    8. Relapse
    9. Remission
    10. Terminal
- II. Tumors
  - A. Terminology
  - B. Classifications
    1. Benign
    2. Malignant
  - C. Causes of cancer
  - D. Diagnosis of cancer
    1. Grading of cancer
    2. Staging of cancer
  - E. Surgical treatments according to location, grade and stage
  - F. Systemic effects of cancer
    1. Anemia
    2. Bleeding
    3. Infections

- 4. Paraneoplastic syndromes
  - 5. Weight loss (cachexia)
- III. Fluid and hemodynamic disorders
  - A. Dehydration
  - B. Edema
  - C. Electrolyte imbalances
  - D. Embolism
  - E. Hemorrhage
  - F. Hyperemia
  - G. Shock
  - H. Sodium/potassium
  - I. Thrombosis
- IV. Inflammation and infection
  - A. Effect on healing of the surgical wound
  - B. Trauma and effects on tissue healing
  - C. Types of infection and effect on surgical wound healing
- V. Surgically treatable diseases and disorders
  - A. Treatment
    - 1. Curative
    - 2. Palliative
    - 3. Adjunct treatment
      - a. Chemotherapy
      - b. Radiation
  - B. Integumentary system
    - 1. Diagnostic tests
    - 2. Diseases and disorders
      - a. Chemical injury
      - b. Electrical injury
      - c. Infectious and inflammatory disease
        - (1) Cellulitis
        - (2) Frost bite
        - (3) Nevus
        - (4) Warts
      - d. Mechanical injury
      - e. Neoplasms
        - (1) Basal cell carcinoma
        - (2) Keratosis
        - (3) Melanoma
        - (4) Squamous cell
      - f. Pressure injury
      - g. Radiation injury
      - h. Thermal injury
        - (1) Burns
        - (2) Hyperthermia
        - (3) Hypothermia

- C. Musculoskeletal system
  - 1. Diagnostic tests
  - 2. Diseases and disorders
    - a. Bone
      - (1) Bone tumors
      - (2) Cancer
      - (3) Circulatory disturbances
        - (a) Avascular necrosis
      - (4) Cysts
      - (5) Deformities
        - (a) Kyphosis
        - (b) Pagets disease (osteitis deformans)
        - (c) Pectus excavatum
        - (d) Pectus carinatum
        - (e) Radial dysplasia
        - (f) Rickets (osteomalacia)
        - (g) Scoliosis
        - (h) Talipes (clubfoot)
      - (6) Fractures
        - (a) Closed
        - (b) Colles'
        - (c) Comminuted
        - (d) Compression
        - (e) Depressed
        - (f) Dislocations
        - (g) Greenstick
        - (h) Impacted
        - (i) Linear
        - (j) Oblique
        - (k) Open
        - (l) Pathologic
        - (m) Potts
        - (n) Simple
        - (o) Spiral
        - (p) Sprains
        - (q) Stress
        - (r) Transverse
        - (s) Trauma
    - b. Joints
      - (1) Ankylosing spondylitis
      - (2) Gout
      - (3) Infectious arthritis
      - (4) Osteoarthritis
      - (5) Rheumatoid arthritis



- c. Muscle and connective tissue
      - (1) Bursitis
      - (2) Carpal tunnel syndrome
      - (3) Fibromyalgia
      - (4) Marfan's syndrome
      - (5) Muscular dystrophies
      - (6) Myasthenia gravis
  - D. Nervous system
    - 1. Diagnostic tests
    - 2. Diseases and disorders
      - a. Central nervous system infections
      - b. Cranial nerve tumors
      - c. Disorders
        - (1) Cerebral palsy
        - (2) Epilepsy
        - (3) Hydrocephalus
        - (4) Parkinson's
        - (5) Spina bifida
      - d. Functional
        - (1) Abscess
        - (2) Degenerative disk disease
        - (3) Encephalitis
        - (4) Neurodegenerative disease
        - (a) Dementia
      - e. Neoplasms of the central nervous system
        - (1) Astrocytoma
        - (2) Glioma
        - (3) Meningioma
        - (4) Metastases to the brain
        - (5) Neural cell precursor tumor
      - f. Trauma
        - (1) Brain
        - (2) Spinal cord
      - g. Vascular
        - (1) Arteriovenous malformation
        - (2) Epidural hematoma
        - (3) Infarction
        - (4) Intracerebral hemorrhage
        - (5) Ischemia
        - (6) Subarachnoid hemorrhage due to aneurysm repair
  - E. Sensory system
    - 1. Diagnostic tests
      - a. Ear
      - b. Eye

2. Diseases and disorders
  - a. Ear
    - (1) Otitis externa
    - (2) Otitis media
    - (3) Otosclerosis
    - (4) Mastoiditis
    - (5) Meniere's disease
    - (6) Tinnitus
    - (7) Trauma
      - (a) Ruptured tympanic membrane
    - (8) Vertigo
  - b. Eye
    - (1) Cataract
    - (2) Conjunctivitis
    - (3) Corneal damage requiring transplant
    - (4) Eye muscle disorders
    - (5) Glaucoma
    - (6) Macular degeneration
    - (7) Retinal detachment
    - (8) Trauma

**F. Cardiovascular system**

1. Diagnostic tests
2. Diseases and disorders
  - a. Arterial
    - (1) Arteriosclerosis
    - (2) Atherosclerosis
      - (a) Ischemia
      - (b) Plaque
  - b. Blood cell
    - (1) Types of clotting disorders
      - (a) Anemias
      - (b) DIC
      - (c) Hemophilia
      - (d) Leukemias
      - (e) Lymphoma
      - (f) Myeloma
  - c. Embolus
    - (1) Air embolus
    - (2) Fat embolus
    - (3) Foreign body
    - (4) Thrombus
  - d. Heart
    - (1) Angina
    - (2) Cardiomyopathy

- (3) Conduction disorders
      - (a) Fibrillation
        - (i) Atrial
        - (ii) Ventricular
      - (b) Tachycardia
      - (c) Complete heart block
    - (4) Congenital heart disease
      - (a) Coarctation of aorta
      - (b) Patent ductus arteriosus
      - (c) Tetralogy of Fallot
    - (5) Congestive heart failure
    - (6) Inflammatory conditions
      - (a) Endocarditis
      - (b) Myocarditis
      - (c) Pericarditis
    - (7) Hypertensive heart disease
    - (8) Myocardial infarction
    - (9) Rheumatic heart disease
    - (10) Valvular disorders
      - (a) Mitral stenosis
      - (b) Murmur
  - e. Peripheral vascular
    - (1) Aneurysms
    - (2) Coronary artery disease
    - (3) Embolus
    - (4) Gangrene
    - (5) Intermittent claudication
    - (6) Raynaud's disease
    - (7) Thrombophlebitis
  - f. Veins
    - (1) Varicose veins
- G. Respiratory system
  - 1. Diagnostic tests
  - 2. Diseases and disorders
    - a. Lower respiratory diseases
      - (1) Atelectasis
      - (2) Aspiration
      - (3) Chronic obstructive pulmonary diseases
        - (a) Pleural effusion
        - (b) Pulmonary embolus
      - (4) Congenital diseases
        - (a) Cystic fibrosis
      - (5) Infectious diseases
        - (a) Bronchitis
        - (b) Empyema

- (c) Legionnaires disease
      - (d) Pneumonia
      - (e) Tuberculosis
    - (6) Neoplasms of the respiratory tract
    - (7) Pleuritis and removal of pleural sac
    - (8) Trauma
      - (a) Pneumothorax
      - (b) Hemothorax
  - b. Upper respiratory diseases
    - (1) Laryngitis
    - (2) Nasal polyps
    - (3) Sinusitis
    - (4) Tonsillitis and adenoiditis
- H. Digestive system
  - 1. Diagnostic tests
  - 2. Diseases and disorders
    - a. Mouth
      - (1) Cancer of the mouth and mandible
      - (2) Congenital defects
      - (3) Infections
      - (4) Inflammatory disease
      - (5) Salivary gland disorders
      - (6) Trauma
    - b. Esophagus
      - (1) Atresia
      - (2) Cancer
      - (3) Esophageal varices
      - (4) Fistula
      - (5) Hiatal hernia
      - (6) Reflux esophagitis
      - (7) Trauma
      - (8) Zenker's diverticulum
    - c. Stomach
      - (1) Cancer
      - (2) Gastritis
      - (3) Pyloric stenosis
      - (4) Trauma
      - (5) Ulcer
    - d. Small intestine
      - (1) Celiac disease
      - (2) Chronic inflammatory bowel disease
      - (3) Crohn's disease
      - (4) Duodenal ulcer
      - (5) Hernia entrapment
      - (6) Meckel's diverticulum
      - (7) Obstruction

- e. Colon
      - (1) Appendicitis
      - (2) Cancer
      - (3) Diverticular disease
      - (4) Inflammatory bowel disease
      - (5) Intussusception
      - (6) Obstruction
      - (7) Peritonitis
      - (8) Polyps
      - (9) Trauma
      - (10) Ulcerative colitis
      - (11) Volvulus
    - f. Diseases of the rectum
      - (1) Cancer
      - (2) Fissure
      - (3) Hemorrhoids
      - (4) Pediatric atresia
      - (5) Trauma
  - 3. Nutrition
    - a. Anorexia nervosa
    - b. Bulimia nervosa
    - c. Obesity
- I. Biliary system
  - 1. Diagnostic tests
  - 2. Diseases and disorders
    - a. Gallbladder
      - (1) Cancer
      - (2) Cholecystitis
      - (3) Cholelithiasis
    - b. Liver
      - (1) Cancer
      - (2) Cirrhosis
      - (3) Hepatitis
      - (4) Portal hypertension
      - (5) Trauma
    - c. Pancreas diseases
      - (1) Cancer
      - (2) Diabetes
      - (3) Pancreatitis
- J. Urinary system
  - 1. Diagnostic tests
  - 2. Diseases and disorders
    - a. Kidney
      - (1) Cancer
      - (2) Glomerulonephritis

- (3) Hydronephrosis
    - (4) Nephrosclerosis
    - (5) Polycystic disease
    - (6) Pyelonephritis
    - (7) Renal calculi
    - (8) Renal failure
    - (9) Wilm's tumor
  - b. Bladder
    - (1) Calculi
    - (2) Cancer
    - (3) Cystitis
    - (4) Neurogenic bladder
    - (5) Retention
    - (6) Trauma
    - (7) Urinary incontinence
    - (8) Urinary reflux
    - (9) Urinary tract infection
- K. Endocrine system
  - 1. Diagnostic tests
  - 2. Diseases and disorders
    - a. Adrenal gland
      - (1) Cancer
      - (2) Hyperadrenalism (Cushing's disease)
      - (3) Hypoadrenalism (Addison's disease)
    - b. Parathyroid gland
      - (1) Hyperparathyroidism
    - c. Pituitary gland
      - (1) Tumor
    - d. Thyroid gland
      - (1) Cancer
      - (2) Goiter
      - (3) Hyperthyroidism (Grave's disease)
      - (4) Hypothyroidism (Hashimoto's disease)
- L. Reproductive system
  - 1. Female reproductive system
    - a. Diagnostic tests
    - b. Diseases and disorders
      - (1) Breast diseases
        - (a) Cancer
        - (b) Fibrocystic disease
        - (c) Paget's disease
      - (2) Cancer
        - (a) Cervical
        - (b) Ovarian
        - (c) Uterine
        - (d) Vulvar

- (3) Emergency obstetrical disorders
  - (a) Abruptio placentae
  - (b) Breech presentation
  - (c) Cephalopelvic disproportion
  - (d) Ectopic pregnancy
  - (e) Nuchal cord
  - (f) Placenta previa
  - (g) Prolapsed cord
  - (h) Spontaneous abortion
  - (i) Toxemia
- (4) Endometriosis
- (5) Herniations
  - (a) Cystocele
  - (b) Rectocele
- (6) Leiomyoma uteri/fibroid tumor
- (7) Menstrual disorders
  - (a) Dysfunctional uterine bleeding
  - (b) Menorrhagia
- (8) Ovarian cyst/torsion
- (9) Pelvic inflammatory disease
  - (a) Toxic shock syndrome
- (10) Uterine prolapse
- 2. Male reproductive system
  - a. Diagnostic tests
  - b. Diseases and disorders
    - (1) Balanoposthitis
    - (2) Benign prostatic hypertrophy
    - (3) Cryptorchidism
    - (4) Epidiymitis
    - (5) Urethral congenital disorder
      - (a) Epispadias
      - (b) Hypospadias
    - (6) Erectile dysfunction
    - (7) Hydrocele
    - (8) Orchitis
    - (9) Penile cancer
    - (10) Phimosis
    - (11) Paraphimosis
    - (12) Prostatic cancer
    - (13) Prostatitis
    - (14) Spermatocoele
    - (15) Testicular cancer
    - (16) Testicular torsion
    - (17) Varicocele

3. Congenital and genetic disorders
  - a. Dwarfism
  - b. Marfan syndrome
  - c. Polydactyly
  - d. Syndactyly
  - e. Albinism
  - f. Phenylketonuria (PKU)
  - g. Sickle cell anemia
  - h. Tay-Sachs
  - i. Down syndrome
  - j. Defects
  - k. Developmental disorders
4. Sexually transmitted diseases
  - a. Chlamydia
  - b. Genital herpes
  - c. Genital warts
  - d. Gonorrhea
  - e. Syphilis
  - f. Trichomoniasis





## **II. TECHNOLOGICAL SCIENCES**



## **ELECTRICITY**

**Objectives:** The learner will:

1. Describe the principles of electricity and electrical flow.
2. Demonstrate electrical knowledge as it relates to patient safety.

**Content:**

- I. Terms
  - A. Circuit
  - B. Conductor
  - C. Current
  - D. Frequency
  - E. Ground
  - F. Insulator
  - G. Isolated circuit
  - H. Radio frequency
  - I. Resistance
  - J. Voltage
  - K. Hertz
  - L. Load
  - M. Cycle
- II. Basic principles of electrical flow
  - A. Electron theory
  - B. Magnetism
  - C. Volts
  - D. Amps
- III. Types of current
  - A. Direct current (DC)
  - B. Alternating current (AC)
- IV. Electrical safety
  - A. Insulators
  - B. Grounded plug
  - C. Protecting self
  - D. Equipment safety
  - E. Electrical shock
  - F. Fire triangle component

## **INFORMATION TECHNOLOGY**

**Objectives:** The learner will:

1. Describe the basic components of a computer system.
2. Apply computer knowledge to the educational process and safe patient care practices in the OR
3. Locate and evaluate information using the latest technology available.

**Content:**

- I. Computer hardware
  - A. Basic computer components
    1. On/off
      - a. Switch user
      - b. Shut down
      - c. Log off
    2. Drives
      - a. Internal storage
      - b. External storage
    3. Monitor
    4. Keyboard
    5. Mouse
    6. Printer/scanner/fax
    7. Modem/wireless card
    8. Speakers
    9. Accessory ports
  - B. Computer applications and document processing
    1. Desktop
    2. Toolbars
      - a. Icons
    3. Finding/opening files
    4. Opening documents
    5. Document management
    6. Printing documents
    7. Saving and closing files/applications

- C.** Internet
  - 1.** E-mail
    - a.** Attaching documents
  - 2.** Search engines
    - a.** Bookmarking
    - b.** Creating favorites
  - 3.** Saving information
    - a.** Source validation
    - b.** Copyright
  - 4.** Information sources
    - a.** Library resource center
    - b.** World Wide Web
    - c.** Databases
    - d.** Periodicals
    - e.** Books
    - f.** CD-ROMs
    - g.** Videos
    - h.** DVDs
    - i.** Manufacturer/industry educational resources
- D.** Patient confidentiality

## **ROBOTICS**

**Objectives:** The learner will:

1. Describe the robotic terms as related to surgery.
2. Describe the surgical applications of robotics.
3. Identify the basic components of equipment used in robotic surgery.
4. Describe the movements of the robotic system manipulators.
5. Apply the principles of robotics to patient safety.

**Content:**

- I. Terms
  - A. Articulated
  - B. Binaural hearing
  - C. Cartesian coordinate geometry
  - D. Cylindrical coordinate geometry
  - E. Degrees of freedom
  - F. Degrees of rotation
  - G. Manipulators
  - H. Pitch
  - I. Resolution
  - J. Revolute geometry
  - K. Roll
  - L. Telechir
  - M. Telepresence
  - N. Yaw
- II. Robotic system
  - A. Clinical application in the operating room
  - B. Decontamination and sterilization components
  - C. Design
    1. Endoscopic positioner
    2. Surgeon console
    3. Manipulators and instrumentation
    4. Telesurgery
  - D. Patient safety
  - E. Preparation and positioning of the robotic system
  - F. Role of the surgical technologist
  - G. Troubleshooting
- III. Other technologies
  - A. Navigation systems

### **III. PATIENT CARE CONCEPTS**





## BIOPSYCHOSOCIAL NEEDS OF THE PATIENT

**Objectives:** The learner will:

1. Discuss the basic physical and biological needs required to sustain life.
2. Compare and contrast various spiritual and cultural needs of the surgical patient.
3. Demonstrate appropriate behavior in response to the needs manifested by the surgical patient.
4. Analyze and describe the potential psychological needs of the surgical patient and family.
5. List and describe potential sources of anxiety and fears of the surgical patient.
6. Identify and discuss the specific needs of the special populations.

**Content:**

- I. Maslow's Hierarchy of Needs
  - A. Physical and physiological needs
  - B. Psychological needs
  - C. Social needs
  - D. Spiritual needs
  - E. Cultural needs
- II. Special population
  - A. Pediatrics
  - B. Geriatrics
  - C. Bariatrics
  - D. Immunocompromised patient
  - E. Diabetic patient
  - F. Pregnant patient
  - G. Physically challenged patient
  - H. Mentally challenged patient
    1. Disabilities (Down's syndrome, etc.)
    2. Post-traumatic stress syndrome (PTSD)
  - I. Isolation patient
  - J. Trauma patient
  - K. Language barriers
  - L. Substance abuse patient

## **DEATH AND DYING**

**Objectives:** The learner will:

1. Evaluate attitudes, beliefs and classifications regarding death and dying.
2. Compare and contrast responses to the process of death and various coping strategies and mechanisms.
3. Debate quality of life vs. quantity of life.
4. Trace the steps that are implemented when a patient death occurs in the operating room.

**Content:**

- I. Death and dying
  - A. Perceptions of death and dying
    1. Religious beliefs
    2. Cultural beliefs
    3. Ethnicity beliefs
    4. Attitudes of family members
    5. Attitudes of caregivers
  - B. Categories of causes of death
    1. Accidental
    2. Terminal
    3. Prolonged (chronic)
    4. Sudden
  - C. Definitions of death
    1. Cardiac
    2. Higher brain
    3. Whole brain
  - D. Responses to loss/grief (Kubler-Ross)
    1. Denial
    2. Anger
    3. Bargaining
    4. Depression
    5. Acceptance
  - E. Quality of life vs. quantity of life
    1. Palliative procedures
    2. Therapeutic procedures
    3. Life-support systems
    4. Life-sustaining therapy
    5. Euthanasia
    6. Right to die
    7. Advance directives
      - a. Living will
      - b. Durable power of attorney

- 8. Do not resuscitate (DNR)
    - a. Medical
    - b. Surgical
- F. Death of a patient in the operating room
  - 1. Notification of perioperative manager
  - 2. Notification of family and significant others
  - 3. Notification of chaplain/clergy
  - 4. Preparation of the body for family viewing
  - 5. Forensic issues and coroner's cases
  - 6. Postmortem patient care/autopsy
  - 7. State and federal law and hospital policy
  - 8. Documentation
- G. Coping strategies
  - 1. Empathy
  - 2. Grieving process
  - 3. Share feelings with others
  - 4. Fears
  - 5. Team effort
  - 6. Support groups for staff members
  - 7. Support groups for bereaved families
  - 8. Chaplain/clergy
- H. Organ and tissue recovery and transplantation
  - 1. Organ and tissue recovery
    - a. Establishing death
    - b. Consent for donation
    - c. Recovery team
    - d. Types of recovery
      - (1) Recovery on life support
      - (2) Recovery without life support
  - 2. Transplantation



#### **IV. SURGICAL TECHNOLOGY**



## **ATTIRE**

**Objectives:** The learner will:

1. Recognize appropriate surgical attire.
2. Employ principles involved in donning surgical attire.

**Content:**

- I. Basic OR attire
  - A. Scrubs
  - B. Hair covering
    1. Surgeon's cap
    2. Bouffant
    3. Surgical hood
  - C. Shoes
  - D. Shoe covers
  - E. Warm-up jacket
  - F. Mask
- II. Accessory attire
  - A. Lab coat/cover coat
  - B. Personal protective equipment (PPE)
    1. Face protection
    2. Eye protection
      - a. Mask with shield
      - b. Glass types with side protection
      - c. Eye glass side inserts
      - d. Goggles
  - C. Name tag/picture identification badge
- III. Restrictions
  - A. Body piercings
  - B. Excessive perfume
  - C. Full coverage of head/facial hair
  - D. Hygiene
  - E. Name tag/ID
    1. Confine when around neck
  - F. No false eyelashes
  - G. No jewelry
  - H. No nail polish/artificial nails
  - I. Tattoos



## **PREOPERATIVE PHYSICAL PREPARATION OF THE PATIENT**

**Objectives:** The learner will:

1. Describe and perform the physical preparation and care that the surgical patient may receive prior to the surgical procedure.
2. Evaluate the items on the pre-operative patient checklist.

**Content:**

- I. Patient physical preparation
  - A. Bowel prep
  - B. Hair removal
  - C. Medications
  - D. Preoperative hygiene
- II. Patient checklist
  - A. Baseline vital signs
  - B. Communication barriers
    1. Interpreter present
  - C. Nail polish removal
  - D. NPO
  - E. Patient personal belongings
  - F. Prosthetics
  - G. Remove body piercings
  - H. Voiding/catheter

## **PATIENT IDENTIFICATION**

**Objectives:** The learner will:

1. State the purpose of proper identification.
2. Demonstrate the identification process for a surgical patient admitted to the surgical suite.

**Content:**

- I. Patient Identification
  - A. Purposes
    1. Correct patient
    2. Correct surgeon
    3. Correct procedure
    4. Correct location
      - a. Side
      - b. Site
  - B. Process
    1. Introduce self to patient
    2. Read patient ID band
    3. Compare patient ID band with surgery schedule
    4. Compare patient ID band with patient chart
    5. Request patient to verbally state:
      - a. Name
      - b. Date of birth
      - c. Allergies
        - (1) Food
        - (2) Medications
        - (3) Adhesives
        - (4) Latex
        - (5) Prep solutions
      - d. Procedure side/site
      - e. Surgeon
    6. Correct site surgery using time out
      - a. Preoperative verification process
      - b. Marking the surgical site
      - c. Alternative for site marking
        - (1) Patient wristband
        - (2) Combative patient
      - d. Process for emergency procedures
    7. Report discrepancies

## TRANSPORTATION

**Objectives:** The learner will:

1. Identify methods of patient transportation.
2. Discuss the factors related to the family members and transportation of the patient.
3. Demonstrate the principles of safe transportation.

**Content:**

- I. Methods
  - A. Crib/isolette
  - B. Self-ambulation
  - C. Stretcher
  - D. Wagon
  - E. Ward bed
  - F. Wheelchair
- II. Safety features of transportation methods
  - A. IV stand/pole
  - B. O<sub>2</sub> holder
  - C. Safety straps
  - D. Side rails
  - E. Wheel locks
- III. Patient transportation safety principles
  - A. Comfort
  - B. Drainage collection devices
  - C. Head/feet first
  - D. Patient self-protection
  - E. Placement of patient chart
  - F. Protect patient dignity
  - G. Slowly and in full control
  - H. Traction apparatus
  - I. Ventilator
- IV. Family considerations
  - A. Explanations to family member(s)
    1. Preoperative holding
    2. Transferring patient to transportation device in hospital room
    3. Transporting patient
  - B. Accompany patient to preoperative holding
    1. Elderly patient
    2. Infant/child
    3. Language barrier
    4. Law enforcement for prisoner
    5. Mentally disabled patient
    6. Physically disabled patient

## **REVIEW OF THE CHART**

**Objectives:** The learner will:

1. Analyze laboratory reports in relationship to patient diagnosis and intervention.
2. Review the patient chart for completeness.

**Content:**

- I. Review of the chart
  - A. Diagnostic tests and interventions
  - B. Documentation
    1. Allergies
    2. Consents
      - (a) Anesthesia
      - (b) Operative
    3. History and physical
    4. Preoperative checklist
    5. Surgeon's orders
  - C. Laboratory values

## **SURGICAL CONSENT**

**Objectives:** The learner will:

1. Analyze the procedure for obtaining informed surgical consent.
2. Analyze the legal concepts of obtaining informed surgical consent.

**Content:**

- I. Purpose
  - A. Protection of health care facility
  - B. Protection of health care providers
  - C. Protection of patient
  - D. Protection of physician
- II. Types
  - A. Medical
  - B. Surgical
    1. Anesthesia administration
    2. Blood administration
    3. Operative procedure
    4. Sterilization consent
  - C. Specific
    1. Investigation/research device
    2. Specimen disposal
    3. Limb disposal
- III. Informed Consent
  - A. Understandable language
  - B. No coercion/intimidation
  - C. Proposed surgical procedure or treatment
  - D. Potential complications
  - E. Potential risks of treatment
  - F. Alternative therapies
    1. Potential risks
- IV. Contents of consent form
  - A. Patient name
  - B. Physician name
  - C. Procedure to be performed
    1. Lay terminology
    2. Medical terminology
  - D. Legal signature
  - E. Witness signature
  - F. Date of signatures
  - G. Time of signatures

- V.** Legal guidelines
  - A.** Legal age of consent
    - 1.** Of legal age
    - 2.** Emancipated minor
    - 3.** Previous child-bearing status
  - B.** Legally competent
  - C.** Mentally competent
  - D.** Special concerns
    - 1.** Alternate methods of obtaining consent
      - a.** Administrative
      - b.** Consulting physicians
      - c.** E-mail
      - d.** Emergent situations
      - e.** Life-threatening circumstances
      - f.** Minor without legal guardian
      - g.** Telephone
    - 2.** Appropriate translation (language)
    - 3.** Court order
    - 4.** Emergency consent
    - 5.** Illiteracy
    - 6.** Sensory impairment

## **TRANSFER**

**Objectives:** The learner will:

1. Discuss methods of patient transfer.
2. Identify equipment utilized for safe transfer of the surgical patient.
3. Employ the principles of body mechanics when transferring the surgical patient.

**Content:**

- I. Transfer
  - A. Methods
    1. Self transfer
    2. Assisted four-person transfer
  - B. Equipment
    1. Safety strap
    2. Transfer devices
      - a. Backboard
      - b. Bariatric patient transfer devices
      - c. Lift sheet
      - d. Roller board
      - e. Slider board
  - C. Principles
    1. Body mechanics
    2. Patient dignity
    3. Patient safety
      - a. OR table locked
      - b. Safety strap
      - c. Secure drains and tubes
      - d. Stretcher locked

## POSITIONING

**Objectives:** The learner will:

1. Analyze the use, components, and aides utilized to achieve various surgical positions.
2. Detail the sections and functions of the OR table.
3. Perform basic positioning.

**Content:**

- I. Factors
  - A. Anesthesia types
  - B. Surgeon's preference
  - C. Patient considerations
  - D. Physiological and anatomical consideration
  - E. Safety
  - F. Procedure/incision site
- II. OR Table
  - A. Function
  - B. Accessories
  - C. Additional supplies
- III. Positions
  - A. Supine (dorsal recumbent)
    1. Trendelenburg
    2. Reverse Trendelenburg
    3. Fowler's (sitting)
    4. Semi-Fowler's (beach chair)
    5. Lithotomy
  - B. Prone
    1. Kraske/jackknife
    2. Knee-chest
  - C. Lateral
    1. Kidney
    2. Simms'
  - D. Fracture table



## URINARY CATHETERIZATION

**Objectives:** The learner will:

1. List the indications for urinary catheterization.
2. Discuss the basic considerations for urinary catheterization.
3. List the supplies required to perform urinary catheterization.
4. Demonstrate urinary catheterization.
5. Discuss the principles of monitoring urine output.

**Content:**

- I. Indications
  - A. Control bleeding
  - B. Decompression of the bladder
  - C. Incontinence
  - D. Keep urine from contact with surgical wound
  - E. Monitor output
  - F. Prevent trauma
  - G. Promote healing
  - H. Provide visualization
  - I. Specimen collection
  - J. Urine retention
- II. Considerations
  - A. Duration of catheterization
  - B. Patient modesty
  - C. Physician's order
  - D. Positioning and lighting
  - E. Size of catheter
  - F. Sterile technique
- III. Supplies
  - A. Catheter set/tray
  - B. Catheter
    1. Indwelling
    2. Irrigating
    3. Temporary
  - C. Urine collection devices
- IV. Procedural steps
  - A. Preparation of supplies
  - B. Insertion
  - C. Securing
  - D. Positioning
    1. Below hip level
    2. Patient position changes

- V.** Monitoring urine output
  - A.** Measurement
  - B.** Assessment
  - C.** Documentation
- VI.** Safety and patient risks
  - A.** Patient positioning injuries
  - B.** Trauma to bladder or urethra
  - C.** Urinary tract infection (UTI)

## SKIN PREPARATION

**Objectives:** The learner will:

1. Compare and contrast different types of skin preparations.
2. Compare and contrast different chemical agents used for skin preparation.
3. Describe the steps and rationales for surgical skin preparation.

**Content:**

- I. Concepts
  - A. Purpose
  - B. Mechanical cleansing/bathing/showering
  - C. Hair removal
    1. Orders
    2. Timing
    3. Area
    4. Techniques
- II. Skin prep
  - A. Mechanics
    1. Pressure
    2. Friction
    3. Chemical antisepsis
  - B. Supplies
    1. Basins
    2. Disposable prep kit
    3. Applicators
      - a. Gauze
      - b. Sponges
      - c. Cotton tip swab
      - d. Impregnated applications
    4. Towel(s)
      - a. Drying
      - b. Absorb excess prep solution
    5. Sterile gloves
    6. Solutions
      - a. Chlorhexidine gluconate (CHG)
      - b. Iodine-based
      - c. 70% isopropyl alcohol
      - d. Hexachlorophene
      - e. Parachlorometaxylenol (PCMX)
  - C. Confirm patient allergies
  - D. Patient communication
    1. Explain procedure
  - E. Procedural steps
    1. Incision to periphery

- F.** Special considerations
  - 1.** Contaminated areas
  - 2.** Skin grafts
    - a.** Donor site
    - b.** Recipient site
  - 3.** Eyes
    - a.** Eyebrows
    - b.** Eyelashes
    - c.** Orbit
  - 4.** Trauma
  - 5.** Cancer
  - 6.** Multiple procedures
- G.** Postoperative removal of solution
- H.** Documentation
  - 1.** Skin condition
    - a.** Preoperatively
    - b.** Postoperatively
  - 2.** Hair removal technique
  - 3.** Prep solutions
  - 4.** Person performing the prep
- I.** Safety concerns
  - 1.** Allergy
  - 2.** Burn from warm prep solution
  - 3.** Chemical burns
  - 4.** Flammability
  - 5.** Pooling of solution
  - 6.** Skin site mark visible

## EQUIPMENT

**Objectives:** The learner will:

1. Assess the function, assembly, use and care of equipment in the surgical environment.
2. Describe the application of surgical equipment.

**Content:**

- I. Lasers
  - A. Laser biophysics
    1. Laser-tissue interaction
    2. Laser versus electrosurgery
    3. Laser wavelengths and colors
    4. Laser system parts
  - B. Laser benefits
  - C. Laser systems
    1. CO<sub>2</sub>
    2. Yttrium-Aluminum Garnet (YAG)
      - a. Erbium
      - b. Holmium
      - c. Neodymium (Nd)
    3. Alexandrite
    4. Q-switched ruby
    5. Diode
    6. Tunable dye
    7. Krypton
    8. KTP
    9. Argon
    10. Excimer
    11. Free electron
  - D. Laser safety
    1. Fire
    2. Plume
    3. Eye protection
      - a. Surgical team
      - b. Patient
    4. Controlled treatment zone
      - a. Signs
      - b. Zone region
    5. Use of backstops
    6. Use of mirrors
    7. Use of non-reflective instruments
    8. Endoscopic precautions
    9. Foot pedals
    10. Electrical hazards
    11. Transportation hazards

- 12. Patient safety
      - a. Non-flammable endotracheal tube
      - b. Wet draping towels
      - c. Wet sponges
      - d. Rectal packing
    - 13. Laser safety checklist
      - a. Knowledge of laser control panel
  - II. Ultrasonic scalpel
    - A. Harmonic scalpel
  - III. Specialty equipment
    - A. Cell saver
    - B. Cryotherapy unit
    - C. CUSA
    - D. Doppler
    - E. Endoscopes
    - F. Fiberoptic headlight
    - G. Insufflator
    - H. Irrigation/aspiration unit
    - I. Light sources
    - J. Microscope
    - K. Nerve stimulator
    - L. Power tools
    - M. Video tower
      - 1. Camera
      - 2. Monitor
      - 3. Recorder/printer
  - IV. Accessory equipment
    - A. Suction systems
    - B. Lights
    - C. Sequential compression devices
    - D. Tourniquets
      - 1. Single-cuff
      - 2. Double-cuff

## INSTRUMENTATION

**Objectives:** The learner will:

1. Identify the classifications, names, parts, materials, finishes and uses of basic surgical instrumentation.
2. Explain the relationship between instrument type and usage.
3. Apply knowledge of basic surgical instrumentation to specific surgical procedures.

**Content:**

- I. Instruments
  - A. Classifications
    1. Accessory
    2. Aspirating and suctioning
    3. Clamping/occluding
    4. Cutting/dissecting
    5. Dilating
    6. Grasping/holding
    7. Microinstrumentation
    8. Probing
    9. Retracting/exposing
    10. Suturing
    11. Stapling
    12. Viewing
  - B. Parts
    1. Box lock
    2. Finger rings
    3. Jaw
    4. Ratchet
    5. Shank
    6. Tip
  - C. Materials
    1. Alloys
    2. Stainless steel
    3. Titanium
  - D. Finishes
    1. Bright, polished
    2. Ebonized, black chromium
    3. Satin, dulled

## ASEPSIS AND STERILE TECHNIQUE

**Objectives:** The learner will:

1. Apply terms related to asepsis.
2. Discuss sources of contamination.
3. Demonstrate sterile technique.

**Content:**

- I. Terminology
  - A. Airborne contamination
  - B. Antiseptic
  - C. Asepsis
  - D. Bacteriocidal
  - E. Bacteriostatic
  - F. Bioburden
  - G. Contamination
  - H. Cross-contamination
  - I. Decontamination
  - J. Disinfectant
  - K. Droplet
  - L. Event-related sterility
  - M. Fomite
  - N. Fungicide
  - O. Infection
  - P. Mode of transmission
  - Q. Nosocomial
  - R. Pathogen
  - S. Resident flora
  - T. Sepsis
  - U. Spore
  - V. Sporicide
  - W. Sterile
  - X. Sterile field
  - Y. Sterile technique
  - Z. Sterilization
  - AA. Strike-through contamination
  - BB. Surgically clean
  - CC. Surgical conscience
  - DD. Surgical site infection (SSI)
  - EE. Terminal disinfection
  - FF. Transient flora
  - GG. Vector
  - HH. Virucide



- II.** Sources of contamination
  - A.** Endogenous
    - 1.** Patient
  - B.** Exogenous
    - 1.** Personnel
    - 2.** Environment
- III.** Principles of asepsis
  - A.** A sterile field is created for each surgical procedure
    - 1.** Only sterile items are used within the sterile field.
    - 2.** Sterile draped tables are sterile only at table top level.
    - 3.** Edges of anything that encloses sterile contents are considered unsterile.
    - 4.** Sterile packages and/or fields are opened or created as close as possible to time of actual use.
    - 5.** Open sterile supplies and sterile field are continuously monitored.
    - 6.** Damage to the integrity of microbial barrier results in contamination.
  - B.** Sterile team members must be appropriately attired prior to entering the sterile field.
    - 1.** Surgical gowns are considered sterile only in the front from mid-chest level to the table level (waist) and sleeves from proximal cuff to 2" above the elbow.
    - 2.** Sterile persons touch only sterile items or areas; unsterile persons touch only unsterile items or areas.
  - C.** Movement in and around the sterile field must not compromise the field.
    - 1.** Unsterile persons avoid reaching over a sterile field; sterile persons avoid leaning over unsterile areas.
    - 2.** Movement within the sterile field should be kept to a minimum.
  - D.** Microorganisms must be kept to an irreducible minimum.
    - 1.** When in doubt about sterility, discard the potentially contaminated item.

## HAND HYGIENE AND SURGICAL SCRUB

**Objectives:** The learner will:

1. Demonstrate the steps of a hand wash.
2. Identify the preliminary preparations for the surgical scrub.
3. Demonstrate the steps of the surgical scrub.
4. Employ sterile technique during the surgical scrub.

**Content:**

- I. Medical handwash
  - A. Gather needed supplies
  - B. Critical elements
    1. Remove jewelry
    2. Wet wrists and hands
    3. Keep fingers pointed downward/hands lower than elbows
    4. Avoid contact with non-sterile surfaces
    5. Wash to 2" above wrists
    6. Do not shake water from hands
    7. Dry hands from fingers to wrists
    8. Follow healthcare facility policy
- II. Surgical scrub
  - A. Preliminary preparations
    1. Open sterile gown and gloves
      - a. Separate surface from sterile set-up
    2. Gather appropriate scrub supplies
    3. Remove jewelry
    4. Don personal protective equipment
    5. Inspect integrity of nails and skin
  - B. Surgical scrub
    1. Antiseptic agents
    2. Methods
      - a. Timed method
      - b. Counted brush-stroke method
      - c. Waterless/brushless methods
    3. Critical elements
      - a. Scrub fingertips to 2" above elbow
      - b. Keep fingertips above elbows
      - c. Avoid contact with non-sterile surfaces
      - d. Brush method utilize four planes
      - e. Follow healthcare facility policy

## **GOWNING AND GLOVING**

**Objectives:** The learner will:

1. Employ sterile technique when gowning and gloving self and when assisting other team members.

**Content:**

- I. Gowning
  - A. Drying hands and arms
  - B. Gowning
    1. Self-gowning
- II. Gloving
  - A. Closed gloving
  - B. Double gloving
- III. Assist team members
- IV. Removal of gown and gloves
  - A. For replacement during procedure
  - B. Completion of procedure
- V. Other gloving techniques
  - A. Open gloving without gown
  - B. Replacing contaminated glove(s) (best-to-least optimal technique 1 – 4)
    1. Replace gown and gloves
    2. Circulator removes glove; other sterile team member re-gloves
    3. Circulator removes glove; surgical technologist re-gloves using open technique
    4. Surgical technologist dons glove over contaminated glove
  - C. Sterile sleeve

## SURGICAL COUNTS

**Objectives:** The learner will:

1. Discuss the purposes and legal responsibilities of counts.
2. Describe the techniques used to prevent foreign body retention.
3. Discuss when counts should be performed.
4. Describe the methods for counting.
5. Demonstrate the procedure for counting instruments, sponges, sharps and other items on the field.

**Content:**

- I. Counting
  - A. Purpose
  - B. Legal responsibility
    1. Documentation
    2. Incorrect counts
    3. Omitted counts
- II. Concepts
  - A. Technique
    1. Concurrent counting
      - a. Two-person verification
      - b. Visual/audible counting
    2. Order of counts
      - a. Field/Mayo stand/back table/off-the-field
  - B. Timing
    1. Initial count
    2. Closure of organ
    3. Closure of body cavity
    4. Closure of subcutaneous or skin
    5. Additional counts
      - a. Change of staff
      - b. Addition of subsequent items
  - C. Methods
    1. Sponge
    2. Sharps
    3. Instruments
    4. Accessories
  - D. Procedure for handling an incorrect count
    1. Preoperatively
    2. Intraoperatively
  - E. Electronic methods of tracking counts
    1. Bar coding
    2. Radio-frequency identification

## **DRAPING**

**Objectives:** The learner will:

1. Describe various types of draping material used in surgical procedures.
2. Select the appropriate drapes for specific positions and surgical procedures.
3. Demonstrate the aseptic principles of draping the patient, equipment, and furniture.

**Content:**

- I. Materials
  - A. Characteristics
  - B. Types
    1. Woven
    2. Non-woven
    3. Plastic
- II. Types of drapes
  - A. Towels
  - B. Fenestrated
  - C. Non-fenestrated
  - D. Adhesive
    1. Barrier
    2. Fire prevention strategy
  - E. Specialty
- III. Draping the patient for surgical procedures
  - A. General surgery
    1. Towel placement and fixation
    2. Handling and passing of drapes
      - a. Cuffing
      - b. Placement
    3. Recognition and correction of contamination
  - B. Specialty
- IV. Draping OR furniture
  - A. Tables
  - B. Ring stands
  - C. Mayo stand
- V. Draping ancillary equipment

## SPECIMEN CARE

**Objectives:** The learner will:

1. Discuss methods of obtaining specimens.
2. Discuss the types of specimen containers.
3. Describe procedure for validating specimen with surgeon and circulator.
4. Describe the procedure for specimen labeling and transfer to appropriate department.
5. Discuss areas for specimen storage.
6. Demonstrate the handling and preservation for specific types of specimens.

**Content:**

- I. Methods of obtaining specimens
  - A. Excisional biopsy
  - B. Incisional biopsy
  - C. Needle aspiration
- II. Specimen handling
  - A. On field
    1. Careful handling
    2. Keep moist
    3. Multiple specimens
      - a. Right and left
      - b. Staging
    4. Orientation of specimen (markings)
    5. Tiny specimens
    6. Validating specimen with surgeon
      - a. Receiving specimen from surgeon
      - b. Transferring to circulator
  - B. Off field
    1. Proper container
    2. Proper label
    3. Proper solution
      - a. Fixative
      - b. Preservative
  - C. Special considerations
    1. Cord blood
    2. Muscle biopsy
    3. Placenta
    4. Radioactive material
- III. Containers
  - A. Sterile
  - B. Non-sterile
  - C. Specific

- IV. Specimen labeling
  - A. Appropriate requisition
  - B. Date and time
  - C. Departmental policy
  - D. Diagnosis
  - E. Logging
  - F. Patient's name
  - G. Patient's hospital number
  - H. Precise test required
  - I. Proper specimen identification
  - J. Surgeon
- V. Specific types of specimens and their care
  - A. Amputated limbs
  - B. Body fluid or washings
  - C. Chain of custody
  - D. Cultures
  - E. Cytologic smears
  - F. Embryo/fetus
  - G. Foreign objects
  - H. Fresh specimens
  - I. Frozen sections
  - J. Legal evidence
    - 1. Bullet
    - 2. Clothing
    - 3. DNA
    - 4. Prosthesis
  - K. Permanent sections
  - L. Stones
  - M. Tissue bank
- VI. Specimen transfer and storage
  - A. Direct transfer to pathology or lab
  - B. Refrigerator
  - C. Room temperature in department
  - D. Transfer to diagnostic imaging
- VII. Incidents
  - A. Incorrect labeling
  - B. Loss of specimen

## ABDOMINAL INCISIONS

**Objectives:** The learner will:

1. Identify the various tissue layers of the abdominal wall.
2. Describe the creation and usage of various surgical incisions.
3. Discuss the advantages and disadvantages of incision types.

**Content:**

- I. Anatomy of the abdominal wall
  - A. Abdominal regions
  - B. Tissues layers
- II. Abdominal incisions
  - A. Vertical
    1. Median (midline)
    2. Paramedian rectus
  - B. Oblique
    1. Lower oblique inguinal
    2. Lumbar (flank)
    3. McBurney
    4. Subcostal (Kocher – right subcostal)
    5. Thoraco-abdominal
    6. Chevron
  - C. Transverse
    1. Midabdominal
    2. Pfannenstiel
    3. Rocky-Davis



## HEMOSTASIS

**Objectives:** The learner will:

1. Analyze the principles of hemostasis.
2. Differentiate among various methods of hemostasis.
3. Assess special techniques of hemostasis.
4. Demonstrate surgical technologists' role in hemostasis.

**Content:**

- I. Principles
  - A. Blood clotting mechanisms
  - B. Blood components
  - C. Monitoring blood loss
- II. Methods of hemostasis
  - A. Mechanical
    1. Bone wax
    2. Clip
    3. Fibrin glues
    4. Hemostatic instruments
    5. Ligatures
    6. Pledgets
    7. Pressure
    8. Tourniquet
    9. Sponges
  - B. Chemical
    1. Absorbable collagen
    2. Absorbable gelatin
    3. Microfibrillar collagen
    4. Oxidized cellulose
    5. Silver nitrate
    6. Epinephrine
    7. Thrombin
  - C. Thermal
    1. Argon beam coagulator
    2. Electrosurgical unit
    3. Laser
    4. Ultrasonic scalpel/coagulator
- III. Techniques
  - A. Hypotension
  - B. Hypothermia

## **EXPOSURE**

**Objectives:** The learner will:

1. Describe principles of exposure.
2. Identify criteria used to select exposure devices.
3. Apply techniques for tissue exposure.

**Content:**

- I. Principles of retracting
  - A. Protect underlying tissues
  - B. Provide wound exposure
- II. Selection of exposure devices
  - A. Tissue application
    1. Diseases affecting tissue durability
  - B. Depth of wound
  - C. Size of incision
  - D. Surgical procedure
- III. Types and uses of retractors
  - A. Hand-held
  - B. Self-retaining
    1. Ratcheted
    2. Bed attachments
  - C. Traction suture
  - D. Vascular loops
  - E. Retracting bowel
    1. Moist laps
  - F. Wound protector bag
  - G. Bowel bag
  - H. Viscera retainer

## CATHETERS AND DRAINS

**Objectives:** The learner will:

1. Compare and contrast the types and characteristics of various catheters and drainage devices.
2. Correlate the correct drainage device for each drain.
3. Compare and contrast the conceptual differences between gravity and vacuum drainage.
4. Prepare catheters and drains for intraoperative use.
5. Prepare anchoring devices for drains.

**Content:**

- I. Concepts of catheter/wound drainage
  - A. Exit for body fluid
    1. Intraoperatively
    2. Postoperatively
  - B. Introduction/placement
    1. End of the incision
    2. "Stab wound"
    3. Natural body orifice
- II. Catheters
  - A. Composition
    1. Latex/rubber
    2. PVC
    3. Silicone
  - B. Sizes
    1. French sizing
  - C. Application
    1. Temporary
    2. Indwelling
  - D. Types
    1. Red rubber (Robinson)
      - a. Description
      - b. Uses
        - (1) Irrigation of ducts
        - (2) Temporary drainage of urine from the bladder
    2. Indwelling/retention
      - a. Description
        - (1) Foley
          - (a) 2-way
          - (b) 3-way
        - (2) Mushroom/Pezzer/Malecot
        - (3) T-tube
      - b. Components
        - (1) Drainage portal

- (2) Balloon portal
      - (3) Irrigation portal
    - c. Uses
      - (1) Long-term access or drainage of a hollow organ
      - (2) Irrigation of a hollow organ
      - (3) Drainage of common bile duct during healing
    - d. Insertion techniques
      - (1) Urinary catheterization
      - (2) Placement of mushroom/Pezzer/Malecot catheter
      - (3) T-tube
    - e. Difficult catheterization
      - (1) Coude
      - (2) Silicone with guide wire
  - 3. Ureteral
    - a. Description
      - (1) Composition
        - (a) Woven silk
        - (b) Woven nylon
        - (c) Plastic
        - (d) Silicone/silastic
      - (2) Radiopaque
    - b. Types
      - (1) Whistle tip
      - (2) Olive tip
      - (3) Cone tip
    - c. Uses
      - (1) Identify and protect during pelvic procedures
      - (2) Contrast solution retrograde X-ray
    - d. Insertion techniques
      - (1) Cystoscope port
  - E. Preparation of urethral catheters
    - 1. Lubrication
- III. Indwelling intravenous catheters
  - A. Description
    - 1. Broviac
    - 2. Hickman
    - 3. Groshong
  - B. Components
    - 1. Single lumen
    - 2. Double lumen
  - C. Uses
    - 1. Infusion of nutrients, blood or medications

- D. Insertion techniques
      - 1. Percutaneously
      - 2. Cut down
      - 3. Into right atrium of heart
- IV. Adapters
  - A. Types
    - 1. Catheter adapters
    - 2. Three-in-one connector
  - B. Uses
- V. Collection devices
  - A. Gravity bedside drainage
    - 1. Urinary collection device
    - 2. Urimeter
- VI. Drains
  - A. Types
    - 1. Passive drains
      - a. Types
        - (1) Penrose
        - (2) Cigarette
    - 2. Active drains
      - a. Types
        - (1) Gravity
          - (a) Urinary drainage
          - (b) T-tube
          - (c) Mushroom/Pezzer/Malecot
        - (2) Vacuum
          - (a) Hemovac
          - (b) Jackson-Pratt
          - (c) Autologous blood retrieval drainage systems
          - (d) Chest tube drainage system
- VII. Collection devices
  - A. Gauze
  - B. Bedside drainage
  - C. Bile bag
  - D. Reservoir
- VIII. Anchoring methods
  - A. Suture
    - 1. Nonabsorbable
    - 2. Cutting needle
  - B. Tape

- IX.** Safety Precautions
  - A.** Emptying contents
    - 1.** Aseptic technique
  - B.** Maintain position of collection devices
    - 1.** Prevent back flow
    - 2.** Prevent infections

## WOUND CLOSURE

**Objectives:** The learner will:

1. Analyze and assess the factors that influence the closure of each wound layer.
2. Compare and contrast suture materials, suture sizing and suture coatings and analyze their significance.
3. Demonstrate proper suture selection, preparation, handling and cutting techniques.
4. Diagram and describe needle points and needle bodies and demonstrate the proper placement, handling, loading and disposal of surgical needles.
5. Evaluate various applications of surgical stapling instruments and demonstrate proper assembly of stapling instrumentation.
6. Compare and contrast reusable and disposable surgical stapling instruments and analyze the advantages and disadvantages of utilizing surgical staplers.
7. Compare and contrast biological adhesives and synthetic adhesives.
8. Analyze and evaluate various tissue repair and replacement materials.
9. Describe the advantages and disadvantages of the repair and replacement materials.
10. Discuss the specific applications of synthetic mesh.

**Content:**

- I. Sutures
  - A. Definitions
    1. Absorbable
    2. Nonabsorbable
    3. Monofilament
    4. Multifilament
    5. Natural
    6. Synthetic
    7. Tensile strength
    8. Pliability
    9. Inert
    10. Capillarity
    11. Ligate
    12. Ligature
      - a. Tie
      - b. "Stick tie"
    13. Instrument tie
    14. Continuous tie
      - a. Ligature reel
    15. Memory
    16. Tissue drag

17. Elasticity
18. Knot-security
- B. Specifications for suture material**
  1. Sterile
    - a. Types of packaging
  2. Uniform tensile strength
  3. Uniform size
  4. Appropriate diameter
  5. Knot security
  6. Minimal foreign body tissue reaction
- C. Selection of suture material**
  1. Classifications of suture materials
    - a. Absorbable vs. nonabsorbable
      - (1) Hydrolysis
      - (2) Enzymatic
    - b. Monofilament sutures vs. multifilament sutures
    - c. Natural vs. synthetic materials
  2. Surgeon selection of suture material
    - a. Biological characteristics of the suture material
      - (1) Absorbable vs. non-absorbable
      - (2) Capillary vs. non-capillary
      - (3) Inertness
    - b. Healing characteristics of tissue
    - c. Incision
      - (1) Location
      - (2) Length
    - d. Infection
      - (1) Absent
      - (2) Present
      - (3) Contaminated wound
      - (4) Drainage from wound
    - e. Patient physical characteristics
    - f. Physical characteristics of suture material
    - g. Surgeon preference
- D. Suture materials**
  1. Natural absorbable sutures
    - a. Materials
      - (1) Surgical gut
        - (a) Plain surgical gut
        - (b) Chromic surgical gut
      - (2) Collagen sutures
    - b. Preservatives
      - (1) Alcohol
    - c. Handling characteristics
    - d. Applications



2. Synthetic absorbable polymers
  - a. Materials
    - (1) Polydioxanone (PDS™)
      - (a) PDS Plus Antibacterial
    - (2) Poliglecaprone 25 (Monocryl™ or Caprosyn™)
      - (a) Monocryl™ Plus Antibacterial
    - (3) Polyglyconate (Maxon™)
    - (4) Polyglactin 910 (Vicryl™)
      - (a) Vicryl™ Plus Antibacterial
    - (5) Polyglycolic acid (Dexon™)
    - (6) Glycoside collected (Polysorb™)
    - (7) Glycomer 631 (Biosyn™)
  - b. Handling characteristics
  - c. Applications
3. Natural nonabsorbable sutures
  - a. Materials
    - (1) Silk
      - (a) Virgin
      - (b) Dermal silk
      - (c) Handling characteristics
      - (d) Applications
    - (2) Stainless steel
      - (a) Handling characteristics
      - (b) Applications
4. Synthetic nonabsorbable polymers
  - a. Materials
    - (1) Surgical nylon
      - (a) Monofilament
        - i) Ethilon
        - ii) Dermalon
        - iii) Monosof
        - iv) Supramid™
        - v) Handling characteristics
        - vi) Applications
      - (b) Multifilament
        - i) Bralon
        - ii) Nurolon
        - iii) Supramid Extra™
        - iv) Surgilon
        - v) Handling characteristics
        - vi) Applications

- (2) Polyester fiber
  - (a) Non-coated
    - i) Dacron
    - ii) Mersilene
    - iii) Handling characteristics
    - iv) Applications
  - (b) Coated
    - i) Ethibond
    - ii) Tevdek
    - iii) Polydek
    - iv) Coatings
      - a) Polybutylate
      - b) Polytetrafluoroethylene
      - c) Silicone
    - v) Handling characteristics
    - vi) Applications
  - (c) Coated or non-coated
    - i) Ticon
    - ii) Handling characteristics
    - iii) Applications
- (3) Polybutester (Novofil™)
  - (a) Handling characteristics
  - (b) Applications
- (4) Polypropylene (Prolene™, Surgipro™, Surgilene™)
  - (a) Handling characteristics
  - (b) Applications
- (5) Polytetrafluoroethylene (PTFE)
  - (a) Handling characteristics
  - (b) Applications
- (6) Gore-Tex™
  - (a) Handling characteristics
  - (b) Applications
- (7) Fiberwire
  - (a) Handling characteristics
  - (b) Applications

- E. Suture preparation
  - 1. Straightening
  - 2. Removal from package
  - 3. Estimating suture needs
  - 4. Sequence of usage

- F.** Packaging of suture materials
  - 1. Box
  - 2. Overwrap
  - 3. Primary packet
  - 4. Inner dispenser
  - 5. Color coding
  - 6. Labeling
- G.** Suture size, material, color and length
  - 1. Product code number
  - 2. Lot number
  - 3. Expiration date
  - 4. Needle
    - a. Shape
    - b. Quantity
    - c. Point geometry
  - 5. Number of strands
  - 6. Controlled release-swaged
- H.** Methods of suturing/suturing techniques
  - 1. Halsted's principles
  - 2. Suturing techniques
    - a. Continuous
      - (1) Continuous (running)
      - (2) Continuous running/locking (blanket stitch)
      - (3) Subcuticular stitch
      - (4) Purse-string suture
    - b. Interrupted
      - (1) Simple interrupted
      - (2) Interrupted horizontal mattress
      - (3) Interrupted vertical mattress
      - (4) Figure-of-eight
      - (5) Buried
      - (6) Retention
      - (7) Traction stitch
  - 3. Retention suture
    - a. Definition
    - b. Applications
    - c. Materials
      - (1) Suture materials
      - (2) Retention bridges
      - (3) Bolsters
      - (4) Bumpers
  - 4. Endoscopic suturing

- a. Applications
    - b. Methods
      - (1) Extracorporeal method
      - (2) Intracorporeal method
        - (a) Endo-loop
        - (b) Free hand
        - (c) Endostitch
  - 5. Accessory devices
    - a. Buttons
    - b. Lead shots
    - c. Umbilical tape
    - d. Vessel loops
    - e. Adhesive skin closure tapes
    - f. Suture anchors
  - 6. Techniques for cutting suture material
- I. Abdominal wall sequence layer closure
    - 1. Peritoneum
    - 2. Muscle
    - 3. Fascia
    - 4. Subcutaneous
    - 5. Subcuticular
    - 6. Skin
  - J. Alternative skin closure
    - 1. Wound zipper
    - 2. Adhesive skin closure strip
    - 3. Cyanoacrylate (Dermabond™)
- II. Surgical needles
- A. Needle characteristics
    - 1. Strong
    - 2. Rigid
    - 3. Sharp
    - 4. Appropriate shape, size, diameter
    - 5. No burrs
    - 6. No corrosion
  - B. Parts of a needle
    - 1. Point
    - 2. Body
    - 3. Eye
  - C. Needle points
    - 1. Shape
      - a. Cutting
        - (1) Conventional cutting
        - (2) Reverse cutting
        - (3) Side cutting
      - b. Taper
        - (1) Regular

- (2) Tapercut
  - (3) Blunt
  - (4) Trocar
- 2. Applications
- D. Needle bodies
  - 1. ¼ circle
  - 2. 3/8 circle
  - 3. ½ circle
  - 4. 5/8 circle
  - 5. Keith
- E. Eyed needles
  - 1. French
  - 2. Split
- F. Swaged
  - 1. Single-armed
  - 2. Double-armed
  - 3. Permanently swaged
  - 4. Control release
- G. Needle holder selection and loading needles
  - 1. Correct size of needle holder
  - 2. Correct position of needle in holder
    - a. Right-handed surgeon
    - b. Left-handed surgeon
    - c. Straight tip needle holder
    - d. Heaney needle holder
    - e. Castroviejo needle holder
  - 3. Correct handing to surgeon
    - a. Right-handed surgeon
    - b. Left-handed surgeon
- H. Needle accountability (see Information Box)
  - 1. Exchange needles one-for-one basis
  - 2. Inspect needles when returned by surgeon
  - 3. Sharps count during case
  - 4. Sharps containers end of case
  - 5. Responsibility for counts
- I. Surgical specialty needles
  - 1. Biopsy needles
  - 2. Cannulated needles
  - 3. Diagnostic needles
  - 4. Injection needles
  - 5. Irrigation needles

Sharps counts and containers are provided in detail in the following documents: "Counts" & "Perioperative Case Management". For purposes of continuity the items are repeated in this document.

- III. Surgical staplers**
- A. Types of staplers**
    - 1. Linear
      - a. GIA
      - b. TA
      - c. Contour
    - 2. Intraluminal circular
      - a. EEA
    - 3. Ligating and dividing
      - a. LDS
    - 4. Fascia
    - 5. Skin
    - 6. Endoscopic
  - B. Reusable staplers**
    - 1. Loading
    - 2. Operation
    - 3. Handling
    - 4. Disassembling and cleaning
  - C. Disposable staplers**
    - 1. Pre-assembled
    - 2. Self-contained
    - 3. Reloadable staple cartridges
    - 4. Materials
      - a. Stainless steel
      - b. Titanium
      - c. Polysorb
    - 5. Handling
    - 6. Disposal
  - D. Advantages**
    - 1. Speed
    - 2. Accelerated wound healing
    - 3. Airtight
    - 4. Leak proof
    - 5. Placed through endoscope
  - E. Disadvantages**
    - 7. Errors in technique
    - 8. Cost containment factors
  - F. Applications**
    - 1. Skin closure
    - 2. Fascial closure
    - 3. Division of tissue
    - 4. Biopsy
    - 5. Resection
    - 6. Ligation
    - 7. Anastomosis
    - 8. Closure of organs

- IV. Ligating clips
  - J. Materials
    - 1. Stainless steel
    - 2. Titanium
    - 3. Tantalum
    - 4. Absorbable
  - K. Reusable vs. disposable
    - 1. Clip bar
    - 2. Applicator
    - 3. Applications
- V. Tissue adhesives
  - A. Biological adhesives
    - 1. Fibrin glue
    - 2. Autologous or homologous plasma
    - 3. Pooled-donor plasma
  - B. Synthetic adhesives
    - 1. Cyanoacrylate
    - 2. Methyl methacrylate
- VI. Tissue repair materials
  - A. Synthetic meshes
    - 1. Advantages
      - a. Easily cut to size
      - b. Pliable
      - c. Porous
        - (1) Allows free drainage
        - (2) Fibrous tissue grows through openings
      - d. Easily sutured
    - 2. Types
      - a. Polyester fiber mesh (Mersilene™ mesh)
      - b. Polyglactin 910 mesh (Vicryl™ mesh)
      - c. Polypropylene mesh (Prolene™ mesh, Marlex™ mesh)
      - d. Polytetrafluorethylene (Gore-Tex™ soft tissue patch)
      - e. Ingrowth mesh (Surgisis™)
      - f. Stainless steel mesh

## SURGICAL DRESSINGS

**Objectives:** The learner will:

1. Evaluate the purposes of surgical dressings.
2. Analyze their importance to postoperative wound care.
3. Compare and contrast the most commonly used types of surgical and specialty dressings.
4. Describe the importance of proper surgical dressing application techniques.
5. Apply proper principles of sterile technique and demonstrate the application of commonly used types of surgical and specialty dressings.

**Content:**

- I. Surgical dressings
  - A. Function
    1. Protect incision
    2. Absorb drainage and secretions
    3. Provide aesthetic appeal
    4. Support incision
    5. Provide pressure
    6. Assist in hemostasis
    7. Maintain moist environment
    8. Preserve new epithelial tissue
  - B. Preparation for dressing application
  - C. Dressing types
    1. Biological dressings
      - a. Skin grafts
    2. One-layer dressings
      - a. Aerosol adhesive spray
      - b. Bioclusive
      - c. Dermabond
      - d. Foams
      - e. Gels
      - f. Hydrocolloids
      - g. Steri-strips
      - h. Op-site
      - i. Skin preparation agents
        - (1) Benzoin
        - (2) Mastisol
    3. Three-layer dressing
      - a. Three types of inner layers (also called primary; nonadherent; contact layer)
        - (1) Occlusive (nonpermeable)
          - (a) Xeroform
          - (b) Vaseline gauze
          - (c) Povidone-iodine gauze



- (2) Semi-occlusive (semipermeable)
      - (a) Hydrocolloid
      - (b) Hydrogel
    - (3) Nonocclusive (permeable)
      - (a) Adaptic
      - (b) Telfa
  - b. Intermediate layer (also called secondary; absorbent layer)
    - (1) ABD pad
    - (2) Gauze
      - (a) Kerlix™ (fluffed, gauze sponges)
      - (b) Sponges (2 x 2 in.; Toppers™)
  - c. Outer layer (securing; tertiary layer)
    - (1) Tape
      - (a) Cloth
      - (b) Elastoplast
      - (c) Foam
      - (d) Paper
      - (e) Plastic
      - (f) Silk
    - (2) Wrap
      - (a) Ace bandage
      - (b) Coban
      - (c) Rolled gauze (Kling™)
      - (d) Tube gauze
      - (e) Montgomery straps
  - d. Specific types three-layer dressing
    - (1) Bulky dressing
    - (2) Pressure dressing
- 4. Rigid dressings
  - a. Casts
    - (1) Types
    - (2) Padding and skin protection material
      - (a) Stockinette
      - (b) Webril™
  - b. Splints

- 5.** Specialty dressings
  - a.** Bolster
  - b.** Drain
  - c.** Eye pad and shield
  - d.** Ostomy pouch
  - e.** Perineal
  - f.** Pressure
  - g.** Stent
  - h.** Thyroid collar
  - i.** Tracheotomy
  - j.** Wet-to-dry
  - k.** Wet-to-wet
  - l.** Wound vac
- 6.** Packing
  - a.** Nasal packing
  - b.** NuGauze
    - (1)** Iodophor
    - (2)** Plain
  - c.** Vaginal packing

## WOUND HEALING

**Objectives:** The learner will:

1. Compare and contrast intentional, unintentional, and incidental/chronic wounds.
2. Analyze the mechanisms of wound healing, the inflammatory process, and the healing process.
3. Evaluate the classification of surgical wounds, analyze factors that influence healing, and devise a plan to prevent postoperative wound infections.
4. Demonstrate basic wound care concepts and apply the principles of asepsis to the practice of sterile technique.

**Content:**

- I. Wound healing
  - A. Definitions
    1. Adhesions
    2. Collagen
    3. Contracture
    4. Cicatrix
    5. Dead space
    6. Debridement
    7. Dehiscence
    8. Edema
    9. Evisceration
    10. Extravasation
    11. Exudate
    12. Gangrene
    13. Granulation tissue
    14. Granuloma
    15. Hematoma
    16. Hemostasis
    17. Ischemia
    18. Keloid
    19. Necrosis
    20. Seroma
    21. Serosanguinous
    22. Trauma
    23. Tissue reaction
    24. Wound disruption
  - B. Types of wounds
    1. Intentional
      - a. Chemical wounds
      - b. Occlusion banding
      - c. Surgical site incision or excision

2. Unintentional wounds
  - a. Traumatic injuries
  - b. Closed wounds
  - c. Open wounds
    - (1) Simple wounds
    - (2) Clean wounds
    - (3) Complicated wounds
    - (4) Delayed full-thickness injury
    - (5) Contaminated wounds
3. Incidental and chronic wounds
  - a. Pressure sores
  - b. Ulcers
- C. Types of wound healing
  1. First intention/primary union
    - a. Lag phase
    - b. Proliferative phase
    - c. Maturation/differentiation phase
  2. Second intention/granulation
  3. Third intention/delayed primary closure
- D. Considerations
  1. Dead space
  2. Tensile strength
  3. Disease processes
- E. Inflammatory process
  1. Pain
  2. Heat
  3. Swelling
  4. Redness
  5. Loss of function
- F. Phases of wound healing
  1. Fibrinogen
  2. Fibroblasts
  3. Collagen
  4. Network of fibers
  5. Scar tissue
- G. Factors influencing healing
  1. Physical condition
    - a. Age
    - b. Allergic response
    - c. Disease
    - d. Immunosuppressed patients
    - e. Nutritional status
    - f. Obesity
    - g. Smoking
  2. External factors that influence healing processes
    - a. Drug therapy

- b. Fluid and electrolyte balance
  - c. Hematology
  - d. Radiation
- 3. Surgical technique and prevention of wound infections
  - a. Surgical site infections
    - (1) Incisional infection
    - (2) Deep wound infection
    - (3) Nosocomial infection
      - (a) Endogenous infection
      - (b) Exogenous infection
  - b. Prevention of wound infection
    - (1) Reduce sources of contamination
    - (2) Standard precautions
    - (3) Control endogenous infection
    - (4) Tissue perfusion
    - (5) Antibiotic therapy
    - (6) Wound irrigation
    - (7) Wound drains
    - (8) Bowel technique
    - (9) Dressings
  - c. Intraoperative tissue handling
    - (1) Dissection technique
    - (2) Duration of surgery
    - (3) Elimination of dead space
    - (4) Length and direction of the incision
    - (5) Methods of hemostasis
    - (6) Sterile technique
    - (7) Tissue approximation
    - (8) Tissue handling
    - (9) Wound security

## **H. Complications**

- 1. Adhesion(s)
- 2. Fistula
- 3. Hematoma/seroma
- 4. Hemorrhage
- 5. Infection
- 6. Scar
  - a. Surgical cicatrix
  - b. Keloid
- 7. Sinus tract formation
- 8. Suture complications

- 9. Wound disruptions
  - a. Dead space
  - b. Dehiscence
  - c. Evisceration
  - d. Herniation
  - e. Tissue trauma
  - f. Wound tension
- I. Wound classifications
  - 1. I Clean
  - 2. II Clean-contaminated
  - 3. III Contaminated
  - 4. IV Dirty/infected

## TISSUE REPLACEMENT MATERIALS

**Objectives:** The learner will:

1. Describe tissue replacement materials.
2. Demonstrate knowledge of biological wound cover materials.

**Content:**

- I. Tissue replacement materials
  - A. Biologic wound cover
    1. Autograft
    2. Allograft
    3. Cryopreserved skin
    4. Amniotic membrane
    5. Xenograft
      - a. Porcine dermis
      - b. Artificial skin (Apligraf)
      - c. Atriovenous shunts
      - d. Collagen
      - e. Corium
  - B. Bone materials
    1. Bone
      - a. Bone grafts
      - b. Bone bank
  - C. Tissue transplants
    1. Human dura mater
    2. Human umbilical cord vein graft
    3. Genetically engineered
  - D. Synthetic materials
    1. Characteristics
      - a. Contour and conform to normal tissue
      - b. Stable
      - c. Adequate blood supply
      - d. Adequate tissue coverage
      - e. Sterile
      - f. Compatible
      - g. Minimal tissue reaction
    2. Types
      - a. Carbon fiber
      - b. Metal
      - c. Methyl methacrylate
      - d. Polyester fiber
      - e. Polyethylene
      - f. Polytetrafluorethylene
      - g. Silicone

- E.** Biologic materials
  - 1.** Cargile membrane
  - 2.** Fascia lata
- F.** Storage of tissue replacement materials



## EMERGENCY PATIENT SITUATIONS

**Objectives:** The learner will:

1. Perform duties related to emergencies in the OR setting.
2. Describe the emergency procedures carried out in the OR setting.
3. Obtain CPR certification.

**Content:**

- I. Malignant hyperthermia
  - A. Etiology
  - B. Clinical manifestations
  - C. Management
  - D. Clinical intervention
  - E. Pharmacological interventions
  - F. Prevention
- II. Cardiac arrest
  - A. Etiology
  - B. Clinical manifestations
  - C. Management
  - D. Clinical intervention
    1. CPR
    2. AED or defibrillator
  - E. Pharmacological interventions
  - F. Prevention
- III. Hemolytic reaction
  - A. Etiology
  - B. Clinical manifestations
  - C. Management
  - D. Clinical intervention
  - E. Pharmacological interventions
  - F. Prevention
- IV. Anaphylactic reactions
  - A. Etiology
  - B. Clinical manifestations
  - C. Management
  - D. Clinical intervention
  - E. Pharmacological interventions
  - F. Prevention
- V. Hemorrhage
  - A. Prevention
  - B. Management

## POSTANESTHESIA CARE UNIT (PACU)

**Objectives:** The learner will:

1. Analyze the immediate postoperative care of the surgical patient.
2. Describe potential postoperative discomforts and complications.
3. List necessary equipment in the PACU.

**Content:**

- I. Postoperative patient care
  - A. Airway maintenance
  - B. Check IV, dressing, catheters, drains
  - C. Monitor vital signs
  - D. Note skin condition
  - E. Postoperative complications
  - F. Postoperative discomforts
- II. Equipment
  - A. Bedside
    1. Airway
    2. Bedpan
    3. Electrocardiogram
    4. Emesis basin
    5. Monitors
    6. Oxygen
    7. Pulse oximeter
    8. Sphygmomanometer
    9. Stethoscope
    10. Suction
    11. Urinal
  - B. Departmental supplies and equipment
    1. Crash cart and defibrillator
    2. Dressings
    3. Glucometer
    4. IV equipment
    5. Malignant hyperthermia cart
    6. Tracheotomy tray
- III. Standards, policies and criteria for patient discharge
  - A. Institutional discharge policy
    1. Institutional guidelines
    2. Patient evaluation
    3. Written post-operative and follow-up instructions
    4. Discharge options
    5. Transportation

## METHODS OF DISINFECTION AND STERILIZATION

**Objectives:** The learner will:

1. Define terms related to the terminal disinfection/sterilization process.
2. Identify the methods of processing items during terminal disinfection and/or sterilization.
3. Identify the concepts of microbial barriers.
4. Compare and contrast the materials used for creating microbial barriers.
5. List the methods for sealing microbial barriers.
6. List the process for preparing items for sterilization.
7. Identify variables related to the sterilization process and the materials to be processed.
8. Compare and contrast methods of sterilization.
9. Identify process monitoring devices and methods.

**Content:**

- I. Definitions
  - A. Bioburden
  - B. Disinfection
    1. Terminal disinfection
  - C. Sterilization
    1. Terminal sterilization
    2. Final sterilization
  - D. Event related sterility
- II. Terminal disinfection and sterilization
  - A. Concepts
    1. Reduce bioburden
    2. Reduce risk of transmission of pathogens
  - B. Considerations
    1. Submersible vs. non-submersible instruments
    2. Heat sensitive vs. non-heat sensitive instruments
    3. Lumens
  - C. Concepts of disinfection
    1. Factors affecting disinfectant efficiency
    2. Levels of disinfection
      - a. High
      - b. Intermediate
      - c. Low
    3. Categories of items to be disinfected or sterilized
      - a. Critical
      - b. Semi-critical
      - c. Non-critical
    4. Actions of disinfecting agents
      - a. Chelation
      - b. Enzymatic
      - c. Emulsification

- d. Solubilization
- D. Methods
  - 1. Manual washing and disinfection
    - a. Process
    - b. Types of chemical cleaners
    - c. Considerations
  - 2. Washer-decontaminator
    - a. Process
    - b. Types of chemical cleaners
    - c. Considerations
  - 3. Washer-sterilizer
    - a. Process
    - b. Types of chemical cleaners
    - c. Considerations
  - 4. Ultrasonic cleaner
    - a. Process
    - b. Types of chemical cleaners
    - c. Considerations
- III. Instrument preparation and wrapping
  - A. Process
    - 1. Instrument inspection
    - 2. Instrument preparation
      - a. Instrument assembly or disassembly
      - b. Contents protection
        - (1) Tip protectors
      - c. Placement of instruments in tray
      - d. Internal chemical indicator
    - 3. Packaging methods
      - a. Performance standards of wrapping material
        - (1) Maintain sterility of items
        - (2) Easy removal of items
        - (3) Sterilizing agent reach all surfaces
      - b. Performance characteristics of wrapping material
        - (1) Efficiency
        - (2) Ease of opening
        - (3) Sterilization suitability
        - (4) Strength
        - (5) Support impermeability
        - (6) Seal integrity
        - (7) Safety
        - (8) Sterility maintenance

- c. Wrapping material
      - (1) Woven textiles
        - (a) Concepts
        - (b) Advantages
        - (c) Disadvantages
      - (2) Nonwoven material
        - (a) Concepts
        - (b) Advantages
        - (c) Disadvantages
      - (3) Wrapper application
        - (a) Envelope fold
        - (b) Square fold
      - (4) Sealing method
        - (a) Chemical tape (external monitor)
    - d. Pouches
      - (1) Paper/plastic combination
        - (a) Concepts of use
      - (2) Tyvek®/plastic combination
        - (a) Concepts of use
      - (3) Sealing methods
        - (a) Heat seal
        - (b) Adhesive seal
    - e. Sterilization trays and cases
      - (1) Concepts
      - (2) Advantages
      - (3) Disadvantages
      - (4) Case locking devices
  - 4. Labeling package
    - a. Package contents
    - b. Date of sterilization
    - c. Identification of the sterilizer used
    - d. Cycle number
    - e. Lot control number
    - f. Initials of employee
    - g. Department to receive package
  - 5. Concepts of loading packages on sterilizer cart
- IV. Sterilization
  - A. Considerations
    - 1. Related to the items to be sterilized
      - a. Bioburden
      - b. Bioresistance
      - c. Bioshedding of the packaging material
      - d. Biostate
      - e. Density of the packaging
      - f. Heat sensitive vs. non-heat sensitive instruments

- g. Nutritional status of the microbe(s)
- h. Submersible vs. non-submersible instruments
- i. Presence of lumens
- 2. Related to the sterilization process
  - a. Mechanical process indicators
    - (1) Temperature
    - (2) Time
    - (3) Humidity
    - (a) Saturation
    - (4) Pressure
  - b. Purity of the agent
  - c. Purity of the air
  - d. Penetration of the agent
  - e. Capacity of the autoclave
  - f. Cost
- B. Sterilization Agents
  - 1. Steam under pressure
    - a. Microbial destruction
      - (1) Denaturation of cellular protein
    - b. Gravity displacement
      - (1) Uses
      - (2) Parameters
      - (3) Advantages
      - (4) Disadvantages
    - c. Pre-vacuum
      - (1) Uses
      - (2) Parameters
      - (3) Advantages
      - (4) Disadvantages
      - (5) Bowie-Dick test
    - d. Flash
      - (1) Uses
      - (2) Parameters
      - (3) Advantages
      - (4) Disadvantages
    - e. Biological monitor
      - (1) *Geobacillus stearothermophilus*
      - (2) Types of test packs
      - (3) Placement in autoclave
      - (4) Incubation and reading results
      - (5) Frequency of BI monitoring
      - (6) Implantables

2. Chemical
  - a. Ethylene oxide (EtO)
    - (1) Microbial destruction
      - (a) Interferes with protein metabolism
    - (2) Uses
    - (3) Parameters
    - (4) Advantages
    - (5) Disadvantages
    - (6) Biological monitor
      - (a) *Bacillus atropheous*
      - (b) Types of test packs
      - (c) Placement in autoclave
      - (d) Incubation and reading results
      - (e) Frequency of BI monitoring
      - (f) Implantables
  - b. Glutaraldehyde
    - (1) Microbial destruction
      - (a) Denaturation of cellular protein
    - (2) Uses
    - (3) Parameters
    - (4) Advantages
    - (5) Disadvantages
  - c. Peracetic and acetic acid
    - (1) Microbial destruction
      - (a) Reacts with cellular systems
    - (2) Uses
    - (3) Parameters
    - (4) Advantages
    - (5) Disadvantages
  - d. Hydrogen peroxide plasma
    - (1) Microbial destruction
      - (a) Interferes with cell membrane, enzymes, nucleic acid
    - (2) Uses
    - (3) Parameters
    - (4) Advantages
    - (5) Disadvantages
  - e. Ozone gas
    - (1) Microbial destruction
      - (a) Oxidizes bacteria
    - (2) Uses
    - (3) Parameters
    - (4) Advantages
    - (5) Disadvantages

- f.** Chlorine dioxide gas
    - (1)** Microbial destruction
      - (a)** Interferes with cellular processes
    - (2)** Uses
    - (3)** Parameters
    - (4)** Advantages
    - (5)** Disadvantages
- 3.** Ionizing radiation
  - (a)** Microbial destruction
    - (1)** Disrupts DNA
  - (b)** Uses
  - (c)** Parameters
  - (d)** Advantages
  - (e)** Disadvantages



## **STERILE STORAGE AND DISTRIBUTION**

**Objectives:** The learner will:

1. Identify systems used for sterile storage.
2. Apply principles of sterile storage to handling of sterile supplies.
3. Compare and contrast shelf life and event related sterility.
4. Assess distribution systems used by sterile processing departments.
5. Demonstrate proper technique in storing, handling, and distributing sterile supplies.
6. Demonstrate awareness of improper handling and use of sterile supplies.

**Content:**

- I. Sterile storage
  - A. Systems
  - B. Parameters
  - C. Shelf life
  - D. Event related sterility
  - E. Handling
    1. Stock rotation
    2. Inspection
    3. Transport
    4. Out dates
- II. Distribution
  - A. Systems
  - B. Selection of inventory
  - C. Delivery
  - D. Patient charging methods
  - E. Record keeping
  - F. Safety practices

## ENVIRONMENTAL DISINFECTION OF THE OR

**Objective:** The learner will:

1. Perform decontamination of the OR environment.
2. Analyze the factors and variables of disinfecting agents.
3. Compare and contrast disinfecting agents.

**Content:**

- I. Purposes of environmental decontamination
  - A. Reduce bioburden
  - B. Prevent cross-contamination
  - C. Prevent nosocomial infection
  - D. Prevent employee exposure
- II. Procedure
  - A. Intraoperative decontamination
  - B. Decontamination between procedures
  - C. Terminal cleaning
- III. Disinfection
  - A. Factors for choosing an agent
    1. Microbial resistance to chemicals
      - a. Low-level
      - b. Intermediate-level
      - c. High-level
    2. Mechanism of destruction
      - a. Coagulate cell protein
      - b. Denature cell protein
      - c. Oxidase enzymes
      - d. Bind enzymes
      - e. Alter cell membranes
    3. Nature of microbial contamination
      - a. Normal flora
      - b. Organic soil
    4. Kill time
    5. Methods of application
    6. Porosity of surface
    7. Requirements of cleaning agents
    8. Surface tension
    9. Temperature of agent

- B.** Types of disinfectants
1. Halogens and halogen compounds
    - a. Chlorine compounds
      - (1) Chlorinated lime
      - (2) Sodium hypochlorite
    - b. Iodine-based compounds
  2. Phenols and derivatives
    - a. Hexachlorophene
    - b. Carbolic acid (phenol)
  3. Alcohols
    - a. Ethyl
    - b. Isopropyl
  4. Glutaraldehyde
  5. Ortho-Phthaldehyde (Cidex OPA)

## PERIOPERATIVE CASE MANAGEMENT

**Objectives:** The learner will:

1. Demonstrate methods utilized to analyze and plan for the needs of the surgical case.
2. Select the instruments, supplies and equipment needed for a surgical procedure.
3. Describe the function of the physical components of the operating room.
4. Demonstrate the arrangement, care, handling and assembly of operating room furniture and equipment.
5. Describe the use of instruments and supplies.
6. Demonstrate techniques for preparing the sterile field.
7. Explain the procedures for draping furniture and equipment.
8. Describe placing and securing supplies and equipment for use on the sterile field.
9. Explain methods for monitoring the sterile field.
10. Apply the principles of asepsis to the practice of sterile technique.
11. Assess and anticipate the needs of the surgical team.
12. Integrate variations of case management according to the surgical procedure.
13. Demonstrate postoperative case management duties in an organized manner.
14. Apply standard precautions to the performance of perioperative case management activities.

**Content:**

- I. Perioperative concepts
  - A. Time & motion economy
    1. Awareness of OR environment
    2. Follow established routine
    3. One touch method
    4. Work rapidly
  - B. Perioperative monitoring of the sterile field
    1. Observe for breaks in sterile technique
    2. Correct breaks
    3. Protect sterile field
    4. Sterile technique awareness
- II. Preoperative case management
  - A. Surgical case information
    1. Surgery schedule
    2. Surgeon's preference card
    3. Patient review
      - a. Assessment
      - b. Interview
      - c. Chart
    4. Surgeon consultation

- B.** Preliminary preparations
  - 1. Case cart(s)
  - 2. Select items for case
    - a. Instrumentation
      - (1) Basic
      - (2) Specialty
    - b. Supplies
      - (1) Sterile
      - (2) Non-sterile
    - c. Equipment: Specialty and accessory
      - (1) Sterile
      - (2) Non-sterile
      - (3) Verify functionality
- C.** Preparation of the operating room
  - 1. Damp dust surfaces
  - 2. Arrange furniture
  - 3. Obtain OR table positioning devices
  - 4. Test non-sterile equipment, e.g. suction, x-ray viewing box, OR table
  - 5. Position sterile supplies
  - 6. Open sterile supplies
    - a. Establish sequence
      - (1) Back table pack
      - (2) Basin set
      - (3) Instruments
      - (4) Sterile supplies
  - 7. First scrub CST prepare sterile back table and Mayo stand
  - 8. Counts
  - 9. Gown and glove surgeon(s)
  - 10. Establish sterile field
  - 11. Timeout procedures
- III.** Intraoperative case management
  - A.** Skin incision and procedural concepts
    - 1. Hemostasis
      - a. Ties ready
      - b. Clamps available
    - 2. Dissection
      - a. Blunt
      - b. Sharp
    - 3. Retraction
      - a. Skin incision
      - b. Deep wound
    - 4. Clamp/clamp/cut/tie (CCCT)
    - 5. Hand signals
    - 6. Sponge exchange

7. Sharps management
  - a. Suture and needle
    - (1) Preparation
    - (2) Passing
      - (a) Right handed
      - (b) Left handed
    - (3) Neutral zone
    - (4) Sharps container on back table
8. Instrument management
  - a. Passing
  - b. Cleaning
  - c. Maintain organization
  - d. Tracking
9. Medication and irrigation management
  - a. Dispensing
  - b. Labeling
  - c. Passing
  - d. Tracking amounts used
10. Specimen management
11. Counts management
  - a. Relieved from procedure
  - b. Major case, e.g. trauma
- B. Specific variations
  1. Bowel technique
  2. Cancer technique
  3. Isolation technique
    - a. Specimen(s)
    - b. Tuberculosis
- C. Closing
  1. Counts management
  2. Retraction
    - a. Deep wound
    - b. Shallow wound
  3. Suture and needle management
  4. Irrigation

- IV. Postoperative case management
  - A. Drains
  - B. Apply dressings
  - C. Breakdown sterile field
    - 1. Remove non-disposables from surgical field, e.g. instruments, power cords
    - 2. Remove and discard disposable supplies, e.g. light handles, drapes, suction tubing, ESU cord, sponges
      - a. Biohazardous bag
      - b. Regular bag
    - 3. Discard linen
      - a. Biohazardous bag
      - b. Regular bag
    - 4. Discard sharps
    - 5. Prepare instruments for decontamination
  - D. Remove gown and gloves
  - E. Wash hands
  - F. Complete documentation
  - G. Patient transfer – OR table to stretcher
  - H. Transport case cart to decontamination room

## **ASSISTANT CIRCULATOR ROLE**

**Objectives:** The learner will:

1. Discuss the perioperative duties of the assistant circulator.
2. Discuss the OR documentation to be completed by the assistant circulator.
3. Demonstrate the duties of the assistant circulator including completion of documentation.

**Content:**

- I. Preoperative assistant circulator duties
  - A. Assist with positioning of OR furniture and equipment
  - B. Assist with opening sterile supplies and instruments
  - C. Tie gowns
  - D. Perform count
  - E. Connect equipment
  - F. Assist transferring patient from stretcher to OR table
  - G. Assist positioning patient
- II. Intraoperative assistant circulator duties
  - A. Monitor OR traffic
  - B. Anticipate needs of sterile team
  - C. Perform counts
  - D. Specimen care
  - E. Intraoperative documentation, e.g. pathology/specimen form; lab form(s)
- III. Postoperative assistant circulator duties
  - A. Dressings and drains
  - B. Assist transferring patient from OR table to stretcher
  - C. Documentation
  - D. Assist with break down of OR



## SURGICAL PROCEDURES – DIDACTIC

### GENERAL

#### Content:

- I.** Appendectomy
  - A.** Open
  - B.** Laparoscopic
- II.** Breast procedures
  - A.** Breast biopsy
    - 1.** Sentinel node biopsy
    - 2.** Needle localization
  - B.** Modified radical mastectomy with auxiliary node dissection
- III.** Cholecystectomy
  - A.** Open
  - B.** Laparoscopic
  - C.** With cholangiogram
- IV.** Colon resection
  - A.** With colostomy
  - B.** Without colostomy
- V.** Gastrectomy
  - A.** With gastrostomy
  - B.** Without gastrostomy
- VI.** Hemorrhoidectomy
- VII.** Herniorrhaphy: Open and laparoscopic
  - A.** Incisional
  - B.** Inguinal
  - C.** Umbilical
- VIII.** Laparoscopic Nissen fundoplication
- IX.** Liver resection
- X.** Splenectomy
  - A.** Open
  - B.** Laparoscopic
- XI.** Thyroidectomy
- XII.** Pancreaticoduodenectomy (Whipple Procedure)

#### Co-related Procedures Concept

There are surgical procedures that are similar as far as procedural steps, instrumentation, supplies, patient position, etc. This is referred to as the “Co-Related Procedures Concept”. For example, colon resection is required to be taught; however, small bowel resection is not listed since it is the same or co-related procedure. The instructor has the academic freedom to either inform the student that small bowel resection is performed like a colon resection or go above and beyond CCST requirements and teach small bowel resection in-depth. The purpose of using the Co-Related Procedures Concept is to provide the instructor additional time to teach surgical procedures as well as to avoid repetition.

## **SURGICAL PROCEDURES – DIDACTIC**

### **OBSTETRIC AND GYNECOLOGIC**

#### **Content:**

- I.** Cervical
  - A.** Cervical biopsy
  - B.** Cervical cerclage (Shirodkar's procedure)
  - C.** Dilation and curettage (D&C)
  - D.** Hysteroscopy
- II.** Uterine, ovarian, and fallopian tubes
  - A.** Uterine
    - 1.** Cesarean section
    - 2.** Endometrial ablation
    - 3.** Hysterectomy
      - a.** Laparoscopic
      - b.** Robotic assisted
      - c.** Total abdominal
      - d.** Vaginal
    - 4.** Myomectomy
    - 5.** Uterine radiation seeding
  - B.** Ovarian
    - 1.** Oophorectomy
  - C.** Fallopian tubes
    - 1.** Ectopic pregnancy
    - 2.** Salpingectomy
    - 3.** Sterilization procedures
    - 4.** Tuboplasty
- III.** External genitalia
  - A.** Labioplasty
  - B.** Perineal laceration
  - C.** Vulvectomy
- IV.** Vaginal
  - A.** Ablation of condylomata
  - B.** Marsupialization of Bartholin's gland (cystectomy)
- V.** Pelvic
  - A.** Anterior and posterior repair (colporrhaphy)
  - B.** Diagnostic laparoscopy
  - C.** Total pelvic exenteration
  - D.** Wertheim procedure (radical hysterectomy)

## **SURGICAL PROCEDURES – DIDACTIC**

### **GENITOURINARY**

#### **Content:**

- I.** Kidney, ureter & bladder
  - A.** Kidney
    - 1.** Nephrectomy
    - 2.** Kidney transplant
    - 3.** Wilm's tumor excision
    - 4.** Adrenalectomy
  - B.** Ureter
    - 1.** Ureteroscopy
    - 2.** Ureteropyelithotomy
  - C.** Bladder
    - 1.** Cystoscopy
      - a.** TURBT
    - 2.** Cystectomy with creation of ileal conduit
    - 3.** Suspension (TVT/sling)
- II.** Prostate
  - A.** TURP
  - B.** Prostatectomy
    - 1.** Laparoscopic with robot
    - 2.** Suprapubic
  - C.** Prostate seeding
- III.** Penile
  - A.** Circumcision
  - B.** Epispadias repair
  - C.** Hypospadias repair
  - D.** Penile implant insertion
  - E.** Penectomy
- IV.** Testicular
  - A.** Hydrocelectomy
  - B.** Orchiopexy
  - C.** Orchiectomy

## **SURGICAL PROCEDURES – DIDACTIC**

### **OTORHINOLARYNGOLOGY**

#### **Content:**

- I.** Ear
  - A.** Cochlear implant
  - B.** Mastoidectomy
  - C.** Myringotomy
  - D.** Stapedectomy
  - E.** Tympanoplasty
- II.** Nose
  - A.** Choanal atresia
  - B.** Functional endoscopic sinus surgery (FESS)
  - C.** Calwell-Luc
  - D.** Nasal polypectomy
  - E.** Septoplasty
  - F.** Turbinectomy
- III.** Oral cavity and throat
  - A.** Laryngectomy
  - B.** Parotidectomy
  - C.** Radical neck dissection
    - 1.** Glossectomy
    - 2.** Mandibulectomy
  - D.** Temporomandibular joint arthroscopy (TMJ)
  - E.** Tonsillectomy and adenoidectomy (T & A)
  - F.** Tracheotomy and tracheostomy
  - G.** Uvulopalatopharyngoplasty

## **SURGICAL PROCEDURES – DIDACTIC**

### **ORTHOPEDIC**

#### **Content:**

- I. Shoulder**
  - A. Acromioplasty**
    - 1. Open**
    - 2. Arthroscopic**
  - B. Arthroscopy**
  - C. Bankart procedure**
    - 1. Open**
    - 2. Arthroscopic**
  - D. Total arthroplasty**
- II. Radius**
  - A. ORIF**
  - B. External fixator**
- III. Hip**
  - A. Total arthroplasty**
  - B. ORIF**
- IV. Femur**
  - A. Femoral shaft fracture**
    - 1. Rodding**
- V. Knee**
  - A. Arthroscopy**
  - B. Anterior cruciate ligament repair (ACL)**
  - C. Amputation**
    - 1. Above-the-knee (A/K)**
    - 2. Below-the-knee (B/K)**
  - D. Total arthroplasty**
- VI. Ankle and foot**
  - A. Achilles tendon repair**
  - B. Triple arthrodesis**
  - C. Bunionectomy**

## **SURGICAL PROCEDURES – DIDACTIC**

### **ORAL AND MAXILLOFACIAL**

#### **Content:**

- I.** Maxillary and mandibular fractures
  - A.** ORIF
  - B.** Arch bar application
- II.** Cleft repair
  - A.** Lip
  - B.** Palate
- III.** Odontectomy
  - A.** Tooth extraction
- IV.** Maxillary fractures
  - A.** LeFort I
  - B.** LeFort II
  - C.** LeFort III
- V.** Frontal fractures
  - A.** ORIF orbital fracture

## **SURGICAL PROCEDURES – DIDACTIC**

### **PLASTIC AND RECONSTRUCTIVE**

#### **Content:**

- I.** Head and face
  - A.** Blepharoplasty
  - B.** Brow lift
  - C.** Cheiloplasty/palatoplasty
  - D.** Malar implants
  - E.** Mentoplasty
  - F.** Otoplasty
  - G.** Rhinoplasty
  - H.** Rhytidectomy
- II.** Breast
  - A.** Mammoplasty
    - 1.** Augmentation
    - 2.** TRAM
  - B.** Nipple reconstruction
  - C.** Mastopexy
- III.** Abdomen
  - A.** Abdominoplasty
  - B.** Suction lipectomy
- IV.** Superficial lesion/neoplasm
- V.** Skin grafts
  - A.** Full thickness skin graft (FTSG)
  - B.** Split thickness skin graft (STSG)
  - C.** Microvascular pedicle graft
- VI.** Scar revision
- VII.** Hand procedures
  - A.** Dupuytren's contracture
  - B.** Traumatic injury repairs
- VIII.** Correction of congenital defects
  - A.** Repair of radial dysplasia
  - B.** Ablation of radial thumb and collateral ligament reattachment (polydactyly of hand)
  - C.** Release of syndactyly of the hand

## **SURGICAL PROCEDURES – DIDACTIC**

### **OPHTHALMIC**

#### **Content:**

- I.** Chalazion excision
- II.** Dacryocystorhinostomy
- III.** Entropion/ectropion repair
- IV.** Enucleation
- V.** Extracapsular cataract excision
- VI.** Iridectomy
- VII.** Keratoplasty
- VIII.** Laceration repairs
- IX.** Scleral buckle
- X.** Strabismus correction
  - A.** Recession and resection
- XI.** Vitrectomy



## **SURGICAL PROCEDURES – DIDACTIC**

### **CARDIOTHORACIC**

#### **Content:**

- I.** Thoracic
  - A.** Bronchoscopy
  - B.** Mediastinoscopy
    - 1.** Lymph node biopsy
  - C.** Thoracoscopy
    - 1.** Video assisted thoracic surgery (VATS)
  - D.** Thoracotomy
    - 1.** Lobectomy
    - 2.** Pneumonectomy
    - 3.** Decortication of the lung
    - 4.** Lung transplant
    - 5.** Pectus excavatum repair
    - 6.** Pulmonary thromboendarterectomy
- II.** Adult cardiac procedures
  - A.** Aortic valve repair
  - B.** CABG with CPB
  - C.** Heart transplant
  - D.** IABD
  - E.** MID-CABG
  - F.** Off-pump CABG
  - G.** VAD
  - H.** Ventricular aneurysm repair
- III.** Pediatric cardiac procedures
  - A.** Atrial septal defect
  - B.** Closure of patent ductus arteriosus
  - C.** Repair of coarctation of the aorta
  - D.** Tetralogy of Fallot repair

## **SURGICAL PROCEDURES – DIDACTIC**

### **PERIPHERAL VASCULAR**

#### **Content:**

- I.** Abdominal aortic aneurysm with graft insertion
- II.** Angioplasty
  - A.** Endograft placement
  - B.** Endostent insertion
- III.** Angioscopy
- IV.** AV shunts and bypass
  - A.** Aortofemoral bypass
  - B.** Arteriovenous fistula and shunt
  - C.** Femoropopliteal bypass
- V.** Carotid endarterectomy
- VI.** Embolectomy
- VII.** Vena cava device
- VIII.** Vein ligation and stripping
- IX.** Venous access device

## **SURGICAL PROCEDURES – DIDACTIC**

### **NEUROSURGERY**

#### **Content:**

- I.** Carpal tunnel release
- II.** Laminectomy
  - A.** Cervical
    - 1.** Anterior
    - 2.** Posterior
  - B.** Thoracic
  - C.** Lumbar
    - 1.** Minimally invasive
    - 2.** Spinal fixation
- III.** Craniotomy
  - A.** Aneurysm repair
  - B.** Cranioplasty
  - C.** Craniosynostosis repair
- IV.** Rhizotomy
- V.** Stereotactic procedures
- VI.** Transphenoidal hypophysectomy
- VII.** Ulnar nerve transposition
- VIII.** Ventriculoperitoneal shunt placement
- IX.** Ventriculoscopy

## SURGICAL ROTATION CASE REQUIREMENTS

<b>Surgical Specialty</b>	<b>Total # of Cases Required</b>	<b>Minimum # of First Scrub Cases Required</b>	<b>Maximum # of Second Scrub Cases That Can be Applied Towards 120 Cases</b>
General Surgery	30 <sup>2</sup>	20 <sup>2</sup>	10
Surgical Specialties: <ul style="list-style-type: none"> <li>• Cardiothoracic</li> <li>• ENT</li> <li>• Eye</li> <li>• GU</li> <li>• Neuro</li> <li>• Ob-Gyn</li> <li>• Oral/Maxillofacial</li> <li>• Orthopedics</li> <li>• Peripheral vascular</li> <li>• Plastics</li> <li>• Procurement/Transplant</li> </ul>	90 <sup>3</sup>	60 <sup>3</sup>	30
Diagnostic Endoscopy: <ul style="list-style-type: none"> <li>• Bronchoscopy</li> <li>• Colonoscopy</li> <li>• Cystoscopy</li> <li>• EGD</li> <li>• ERCP</li> <li>• Esophagoscopy</li> <li>• Laryngoscopy</li> <li>• Panendoscopy</li> <li>• Sinoscopy</li> <li>• Ureteroscopy</li> </ul>			10 diagnostic endoscopy cases may be applied toward the second scrub cases. <sup>5</sup>
Labor & Delivery			5 vaginal delivery cases may be applied toward the second scrub cases. <sup>5</sup>
<b>Totals</b>	<b>120<sup>1, 7</sup></b>	<b>80</b>	<b>40</b>

1. The total number of cases the student must complete is 120.
2. Students are required to complete 30 cases in General Surgery. Twenty of the cases must be in the First Scrub Role.
3. Students are required to complete 90 cases in various surgical specialties. Sixty of the cases must be in the First Scrub Role and evenly distributed between a minimum of 5 surgical specialties. However, 15 is the maximum number of cases that can be counted in any one surgical specialty.
4. The surgical technology program is required to verify through the surgical rotation documentation the students' progression in First and Second Scrubbing surgical procedures of increased complexity as he/she moves towards entry-level graduate abilities.
5. Diagnostic endoscopy cases and vaginal delivery cases are not mandatory. But up to 10 diagnostic endoscopic cases and 5 vaginal delivery cases can be counted towards maximum number of Second Scrub Role cases.
6. Observation cases must be **documented**, but do not count towards the 120 required cases.
7. **Counting Cases**
  - Cases will be counted according to surgical specialty. Examples:
    - Trauma patient requires a splenectomy and repair of a Lefort I fracture. Two cases can be counted and documented since the splenectomy is general surgery specialty and repair of LeFort I is oral-maxillofacial surgical specialty.
    - Patient requires a breast biopsy followed by mastectomy. It is one pathology, breast cancer, and the specialty is general surgery; therefore, it is counted and documented as one procedure – one case.

## **FIRST AND SECOND SCRUB ROLE AND OBSERVATION**

### **FIRST SCRUB ROLE**

The student surgical technologist shall perform the following duties during any given surgical procedure with proficiency. The following list is provided to identify the items that must be completed in order to document a case in the first scrub role. A student not meeting the five criteria below cannot count the case in the first scrub role and the case must be documented in the second scrub role or observation role.

- Verify supplies and equipment needed for the surgical procedure.
- Set up the sterile field with instruments, supplies, equipment, medication(s) and solutions needed for the procedure.
- Perform counts with the circulator prior to the procedure and before the incision is closed.
- Pass instruments and supplies to the sterile surgical team members during the procedure.
- Maintain sterile technique as measured by recognized breaks in technique and demonstrate knowledge of how to correct with appropriate technique.

### **SECOND SCRUB ROLE**

The second scrub role is defined as the student who is at the sterile field who has not met all criteria for the first scrub role, but actively participates in the surgical procedure in its entirety by completing any of the following:

- Sponging
- Suctioning
- Cutting suture
- Holding retractors
- Manipulating endoscopic camera

### **OBSERVATION ROLE**

The observation role is defined as the student who is in the operating room performing roles that do not meet the criteria for the first or second scrub role. These observation cases are not to be included in the required case count, but must be documented by the program.



## **V. PROFESSIONAL PRACTICE**





## PROFESSIONAL MANAGEMENT

**Objectives:** The learner will:

1. Describe the characteristics of the professional surgical technologist.
2. Compare and contrast professional organizations related to the profession.
3. Describe the credentialing options available to the surgical technologist.

**Content:**

- I. Professionalism
  - A. Traits of the professional surgical technologist
    1. Personal and professional behaviors
      - a. *Aeger Primo* (The Patient First)
      - b. Critical thinking skills
        - (1) Identify problem
          - (a) Anticipate and plan for the unexpected
        - (2) Define problem
        - (3) Gather information
        - (4) Identify solutions
        - (5) Evaluate outcomes
          - (a) Analyze role in prevention strategies
      - c. Surgical conscience
    2. Supports profession (e.g. membership in AST)
    3. Participates in professional self-development
    4. Educates others about the profession
  - B. Obtains and maintains national certification from NBSTSA
  - C. Supports and participates in continuing education
  - D. Community service
  - E. Service to others
    1. Mentor
    2. Role model
  - F. Ethical behavior
- II. Professional organizations and credentialing
  - A. Commission on Accreditation of Allied Health Education Programs (CAAHEP)
  - B. Accreditation Review Council on Education in Surgical Technology & Surgical Assisting (ARC/STSA)
  - C. Association of Surgical Technologists (AST)
    1. Historical background
    2. Goals
    3. Purpose
    4. Membership composition
    5. Committees
    6. Meetings

7. Annual national conference
8. Workshops and forums
9. State assemblies
10. Professional liability insurance
11. AST journal *The Surgical Technologist*
- D.** Credentialing organizations
  1. National Board of Surgical Technology & Surgical Assisting (NBSTSA)
- E.** Related professional organization
  1. American College of Surgeons (ACS)
  2. American Medical Association (AMA)
  3. American National Standards Institute (ANSI)
  4. American Society of Anesthesiologists (ASA)
  5. Association for Professionals of Infection Control and Epidemiology (APIC)
  6. Association for the Advancement of Medical Instrumentation (AAMI)
  7. Association of periOperative Registered Nurses (AORN)
  8. Centers for Disease Control and Prevention (CDC)
  9. Emergency Services Advanced Registry for Volunteer Health Professionals (ESAR-VHP)
  10. Environmental Protection Agency (EPA)
  11. Food and Drug Administration (FDA)
  12. International Association of Healthcare Central Service Materiel Management (IAHCSMM)
  13. The Joint Commission
  14. Medical Reserve Corps (MRC)
  15. National Disaster Life Support Education Consortium (NDLSEC)
  16. National Fire Protection Association (NFPA)
  17. National Institute of Occupational Safety and Health (NIOSH)
  18. Occupational Safety and Health Administration (OSHA)
  19. World Health Organization (WHO)
- F.** Private volunteer agencies
  1. Local
  2. State
  3. Federal

## **EMPLOYABILITY SKILLS**

**Objectives:** The learner will:

1. Assess current trends and employment opportunities for the surgical technologist.
2. Develop a plan of action to secure employment in the health care field.
3. Evaluate personal employability qualities and develop an employment strategy that includes positive characteristics.
4. Develop a professional resume.
5. Compare and contrast various types of employment/application correspondence.
6. Analyze various interview strategies.
7. Contrast and compare the various roles in the surgical technology profession.
8. Demonstrate responsible and accountable behavior within the role and competencies of the surgical technologist.

**Content:**

- I. Employment in the healthcare field
  - A. Career information
    1. Job description
  - B. Current employment trends and opportunities
    1. Anesthesia technician
    2. Central sterile supply manager
    3. Educator
    4. Labor and delivery
    5. Materials manager
    6. Medical salesperson
    7. Office manager
    8. Organ and tissue procurement/preservation technician
    9. Physician/surgeon's assistant
    10. Research assistant
    11. Surgery scheduler
    12. Surgical first assistant
  - C. Employment facilities and institutions
  - D. Transition from student to employee
- II. Employability skills
  - A. Accountability
  - B. Adaptability
  - C. Commitment to continuing education
  - D. Communication skills
  - E. Conflict resolution
  - F. Dedication
  - G. Personal appearance and hygiene
  - H. Previous work history

- III.** Resume preparation
  - A.** Required elements
- IV.** Correspondence
  - A.** Acceptance letter
  - B.** Cover letter
  - C.** Letter of refusal
  - D.** Professional reference letter
  - E.** Thank you letter
- V.** Employment application form
- VI.** Interview preparations
- VII.** Resignation
  - A.** Notice
    - 1.** Verbal
    - 2.** Written
  - B.** Exit interview

## COMMUNICATION SKILLS AND TEAMWORK

**Objectives:** The learner will:

1. Discuss types of communication relationships.
2. Discuss goals of communication.
3. Describe the significance of content and tone in communication.
4. Distinguish between assertive and aggressive behavior.
5. Discuss problem behaviors and coping mechanism.
6. Describe concepts of conflict resolution.
7. Demonstrate principles of communication in the surgical setting.
8. Demonstrate body language and non-verbal communication.
9. Demonstrate principles of teamwork in the surgical environment.

**Content:**

- I. Types of communication relationships
  - A. Social
  - B. Professional
  - C. Therapeutic
- II. Goals of communication
  - A. Provide information
  - B. Obtain information
  - C. Express oneself
  - D. Solve problems
  - E. Persuade audience
  - F. Prevent error in the OR
  - G. Promote patient safety
- III. Principles of communication
  - A. Types of communication
    1. Verbal
    2. Nonverbal
      - a. Tone content
      - b. Body language
      - c. Eye contact
      - d. Touch
      - e. Written
  - B. Components
    1. Sender
    2. Message
    3. Receiver
    4. Feedback
  - C. Qualities of communication
    1. Respect
      - a. Eye contact
      - b. Active listening
      - c. Sensitive
      - d. Assertiveness vs. aggressiveness

- 2. Clarity
- IV. Principles of good teamwork and group interaction
  - A. Team
  - B. Discussion of conflict
  - C. Yielding
  - D. Acceptance
  - E. Politeness
  - F. Collaboration
  - G. Constructive criticism
  - H. Stages of team development
    - 1. Forming
    - 2. Storming
    - 3. Norming
    - 4. Performing
    - 5. Adjourning
- V. Conflict management and problem behaviors
  - A. Verbal abuse
    - 1. Causes
    - 2. Coping
  - B. Lateral violence and bullying
    - 1. Chronic
    - 2. Coping
    - 3. Reporting
  - C. Disruptive behaviors
    - 1. Rumors
    - 2. Coping
  - D. Feedback
    - 1. Positive
    - 2. Negative
    - 3. Implementation
  - E. Sexual harassment and hostile environment
    - 1. Misuse of power
    - 2. Legal implications
    - 3. Coping
    - 4. Reporting
- VI. Conflict resolution
  - A. Communication skills
  - B. Solution concepts
    - 1. Win-Win
    - 2. Win-Lose
    - 3. Lose-Lose

## ETHICAL AND MORAL ISSUES

**Objectives:** The learner will:

1. Review the American Hospital Association's (AHA) Patient Care Partnership
2. Develop an increased sensitivity to the influence of ethics in professional practice.
3. Discuss the role of morality during ethical decision making.
4. Discuss examples of ethical situations and problems in the health professions.
5. Demonstrate the key elements related to developing a surgical conscience.
6. Review principles of problem solving in ethical decision making.
7. Discuss principles of patient confidentiality including verbal and written.

**Contents:**

- I. AHA Patient Care Partnership
- II. Elements of ethical decision making
  - A. Accountability
  - B. Corporate integrity
  - C. Cultural beliefs
  - D. Ethical decision-making
  - E. Ethical principles
  - F. Morality
  - G. Moral dilemmas
  - H. Personal values
  - I. Problem solving
  - J. Religious beliefs
  - K. Responsibility
- III. Surgical conscience
  - A. Concepts
    1. Commitment to cost containment
    2. Confidentiality
    3. Nondiscriminatory treatment of all patients
    4. Personal moral integrity
    5. Principles of asepsis
    6. Professional honesty
    7. Sterile technique
  - B. Barriers
    1. Lack of resources
    2. Peer apathy
    3. Stress
- IV. Ethical conflicts in clinical practice
  - A. Abortion
  - B. Animal experimentation
  - C. Communicable diseases



- D.** Elective sterilization
- E.** Genetic engineering
- F.** Gender reassignment
- G.** Good Samaritan Law
- H.** Human experimentation
- I.** Medicare fraud
- J.** Organ donation and transplantation
- K.** Refusal of treatment
- L.** Reproductive technology
  - 1.** In-vitro fertilization
  - 2.** Artificial insemination
- M.** Right-to-die
  - 1.** Assisted suicide
  - 2.** End-of-life decisions
- N.** Substance abuse
  - 1.** Impaired health care provider
  - 2.** Self
- O.** Stem cell research
- P.** Work place violence

## LEGAL ISSUES, DOCUMENTATION & RISK MANAGEMENT

**Objectives:** The learner will:

1. Analyze the concepts of law.
2. Interpret the legal responsibilities of the surgical technologist and surgical team members.
3. Compare and contrast criminal and civil liabilities and the consequences for these acts.
4. Assess the resources that aid the surgical technologist in interpreting and following professional standards of conduct.
5. Analyze the recommended practices and legal elements of proper documentation.
6. Interpret prevention, correction and documentation techniques that may positively impact risk management issues.

**Content:**

- I. Legal terminology
  - A. Law
    1. Statutory
    2. Common
  - B. Liability
    1. Corporate
    2. Personal
  - C. Torts
    1. Define
    2. Intentional
      - a. Civil assault
      - b. Civil battery
      - c. False imprisonment
      - d. Defamation
      - e. Invasion of privacy
    3. Unintentional
- II. Negligence
  - A. Standard of care
  - B. Failure to meet the standard of care
  - C. Foreseeability of harm existed
  - D. Omission of an act
  - E. Commission of an act
  - F. Actual damages occurred
  - G. Malpractice
    1. Plaintiff
    2. Defendant
    3. Subpeona
    4. Deposition
    5. Trial
    6. Jury

7. Perjury
- III. Legal doctrines
  - A. Doctrine of Personal Liability
  - B. Doctrine of Respondeat Superior
  - C. Doctrine of Borrowed Servant
  - D. Doctrine of Res Ipsa Loquitur
  - E. Doctrine of Foreseeability
  - F. Informed Consent
    1. Patient's right to know
    2. Preparation
    3. Verification
    4. Legality
  - G. Traditional principles
    1. *Aeger Primo* (see Information Box)
    2. *Primum Non Nocere*
  - H. Advance directives
- IV. Professional standards of conduct
  - A. Federal law
  - B. Federal agencies
  - C. State laws and regulations
  - D. Health care facility policy
  - E. Legal precedent
  - F. Professional agencies
  - G. AST Code of Ethics
  - H. AST Recommended Standards of Practice  
([http://www.ast.org/educators/standards\\_table-of-contents.aspx](http://www.ast.org/educators/standards_table-of-contents.aspx))
  - I. Private agencies
- V. Documentation concepts
  - A. Document patient care
    1. Patient care intervention
    2. Evaluation
    3. Outcomes
  - B. Types of documents
    1. Intraoperative record
    2. Consent forms
      - a. Surgical
      - b. Anesthesia
      - c. Sterilization
      - d. Special procedure
      - e. Implants
    3. Sentinel Event Report
    4. Patient charge
    5. Count
    6. Pathology
    7. Laboratory
    8. Patient medical record

*Aeger Primo* is listed in "Professional Management" and repeated here for continuity.

- 9. Anesthesia record
- 10. Birth and death certificates
- 11. Preference card
- 12. Timeout
- C. Legal elements of documentation (see Information Box)
  - 1. Standard terminology and abbreviations
    - a. The Joint Commission “do not use” list  
([http://www.jointcommission.org/NR/rdon/yres/2329F8F5-6EC5-4E21-B932-54B2B7D53F00/0/dnv\\_list.pdf](http://www.jointcommission.org/NR/rdon/yres/2329F8F5-6EC5-4E21-B932-54B2B7D53F00/0/dnv_list.pdf))
  - 2. Spelling
  - 3. Factual information
  - 4. Legible
  - 5. Correction of errors
  - 6. Legal signature of reporter
- VI. Operating room sentinel events
  - A. Harm secondary to use of defective equipment and instruments
    - 1. Safe Medical Devices Act
  - B. Exceeding authority or accepted functions
  - C. Loss or damage of patient’s property
  - D. Abandonment of patient
  - E. Patient misidentification
  - F. Lack of informed consent
  - G. Documentation errors
  - H. Harm secondary to major break in sterile technique
  - I. Specimen
    - 1. Improper identification
    - 2. Loss
  - J. Burns due to use of ESU
  - K. Medication errors
    - 1. Incorrect medication(s)
    - 2. Incorrect administration
  - L. Patient positioning
    - 1. Patient injury
    - 2. Inadequate padding
  - M. Patient falls
  - N. Retained foreign bodies
  - O. Incorrect procedure
  - P. Critical events
    - 1. Failure to recognize
    - 2. Failure to act
  - Q. Invasion of privacy
  - R. Assault
  - S. Battery
  - T. Defamation

Refer to “Medical Terminology” for details on the “do not use” list.
--

- U. Breach of confidentiality
  - 1. HIPAA
  - 2. Confidentiality statement
- VII. Risk management for sentinel events
  - A. Objectives
    - 1. Minimize risks to patients
    - 2. Minimize risks to employees
    - 3. Proactive identification potential causes of sentinel events
    - 4. Implement policies and procedures to eliminate/reduce sentinel events
    - 5. Procedures for collecting data on sentinel events
  - B. Risk management issues
    - 1. Reduced staffing
    - 2. Patient safety
    - 3. Employee rights
  - C. Prevention practices
    - 1. Preventative maintenance of equipment
    - 2. Continuing education for employees
      - a. Annual updates
      - b. Review of policies and procedures
    - 3. Location and use of emergency equipment
  - D. Managing sentinel events
    - 1. Report unsafe conditions
    - 2. Malfunctioning equipment reported
    - 3. Patient injury
      - a. Immediately reported
      - b. Treated
    - 4. Employee injury
      - a. Immediately reported
      - b. Treated
    - 5. Documentation
      - a. Sentinel Event Report
      - b. Witnesses

## HEALTHCARE FACILITY ORGANIZATION AND MANAGEMENT

**Objectives:** The learner will:

1. Compare and contrast the roles of team members in the operating room.
2. Acknowledge the proper chain of command in the operating room.
3. Compare and contrast health care facility departments that relate to direct and indirect patient care in surgical services.

**Content:**

- I. Sterile team members and roles
  - A. First and second scrub roles
    1. Surgical Technologist
    2. LVN/LPN
    3. Registered Nurse
  - B. Surgical first assistant
    1. Surgeon
    2. Nonphysician surgical first assistant
  - C. Surgeon
    1. Medical Doctor (MD)
    2. Doctor of Osteopathy (DO)
    3. Doctor of Dental Science (DDS)
    4. Doctor of Dental Medicine (DDM)
    5. Doctor of Podiatric Medicine (DPM)
- II. Non-sterile team members and roles
  - A. Circulator
    1. Registered Nurse – primary
    2. Surgical Technologist – secondary
  - B. Anesthesia provider
    1. Anesthesiologist (MD or DO)
    2. Certified Registered Nurse Anesthetist (CRNA)
  - C. Support personnel
    1. Anesthesia Technician/Technologist
    2. Biomedical Engineering Technician (BMET)
- III. Technician
  - A. Clerical
  - B. EEG technicians
  - C. Medical sales representatives
  - D. Patient care technician
  - E. Perfusionist
  - F. Radiology technician
  - G. Central sterile supply technician
- IV. Healthcare facility chain of command
  - A. Organizational chart

- V. Related health care facility departments
  - A. Direct patient care
    - 1. Nursing care units
    - 2. Diagnostic imaging
    - 3. Blood bank
    - 4. Pathology
    - 5. Clinical laboratories
    - 6. Surgery department
  - B. Indirect patient care
    - 1. Environmental services
    - 2. Facilities management
    - 3. Processing and decontamination
    - 4. Nutrition services department
    - 5. Biomedical engineering
    - 6. Pharmacy
    - 7. Law enforcement
- VI. Healthcare agencies
  - A. Health insurance
    - 1. Medicare
    - 2. Medicaid
    - 3. Private
    - 4. Preferred provider organizations (PPOs)
    - 5. Health maintenance organizations (HMOs)
  - B. Prospective payment systems
    - 1. Diagnosis-related groups (DRGs)
  - C. Impact of health insurance DRGs

## PHYSICAL ENVIRONMENT

**Objectives:** The learner will:

1. Discuss location of the surgical services within the healthcare facility.
2. Describe basic floor plan designs for surgical services.
3. Describe an optimal location of an operating room.
4. Describe the floor plan of the operating room.
5. Describe the environmental systems and controls within the operative environment.
6. State the proper ranges for temperature and humidity controls.
7. Describe the various components of the operating room ventilation system.
8. Describe the principles of environmental safety controls and guidelines.
9. Discuss the potential hazards in the operating room environment.

**Content:**

- I. Surgical services
  - A. Locations within the healthcare facility
  - B. Floor plan
- II. Principles of the layout
  - A. Traffic patterns
  - B. Environmental control
  - C. Communication systems
- III. Operating room
  - A. Location
  - B. Floor plan
  - C. Environmental systems
    1. Gases
      - a. Oxygen
      - b. Nitrous oxide
      - c. Nitrogen
      - d. Compressed air
    2. Suction
    3. Electrical outlets
    4. Environmental control
      - a. Temperature
      - b. Humidity
      - c. Ventilation systems
        - (1) Positive pressure
        - (2) Negative pressure
        - (3) Air exchange rate
        - (4) Laminar flow



- 5.** Environmental safety
  - a.** Traffic control
  - b.** Electrical hazards
  - c.** Fire safety
  - d.** Radiation precautions
  - e.** Surgical plume
  - f.** OSHA guidelines
    - (1)** Material Safety Data Sheets (MSDS)
    - (2)** Standard precautions
  - g.** CDC guidelines
    - (1)** Post-exposure protocols

## ALL-HAZARDS PREPARATION

### Definition:

All-Hazard Preparation is required to be taught and must cover these competency domains: preparation and planning, detection and communication, incident management and support systems, safety and security, clinical/public health assessment and intervention, contingency, continuity, and recovery, and public health law and ethics.

### Objectives: The learner will:

1. Describe disasters or public health emergencies that impact public health including the different types (e.g. natural, unintentional, & terrorist events) along with the general health, safety and security risks.
2. Describe the all-hazards framework.
3. Explain key components of personal, family, institutional, community and regional disaster preparation and planning as related to the following:
  - a. Available informational resources
  - b. Special needs of individuals
  - c. Precautions and actions for protection
  - d. Detection
  - e. Immediate response
  - f. Short Term Interventions
  - g. Long Term Interventions
4. Describe communication strategies and procedures used in a disaster including barriers to communicating and disseminating health information, reporting systems and procedures for contacting family, coworkers, and local authorities.
5. Describe the purpose & relevance of disaster support services including rationale for integration and coordination of all systems:
  - a. National Response Framework(NRF)
  - b. National Incident Management Systems(NIMS)
  - c. Hospital Incident Command System(HICS)
6. Describe the potential impact of mass casualties on the clinical and public health resources including infection control precautions, personal protective equipment, and decontamination procedures.
7. Explain the role of triage as a basis for prioritizing or rationing health care services for victims.
8. Describe the possible medical and mental health consequences, interventions, and solutions for managing those affected including the psychological, emotional, cultural, religious, and forensic considerations for management of mass fatalities and the resources, supplies and services available.
  - a. Immediate care
  - b. Mass fatality management
  - c. Mass evacuation
  - d. Mass sheltering

- e. Prolonged sheltering
- 9. Explain both the basic life-saving and life-support principles and procedures that can be used at a disaster scene.
- 10. Describe issues relevant to the management of individuals of all ages, populations, and communities affected by a disaster or public health emergency:
  - a. Moral
  - b. Ethical
  - c. Legal
  - d. Regulatory
- 11. Describe the support roles of the surgical technologist in a disaster.

**Content:**

- I. General indicators and epidemiological clues of a disaster
  - A. Natural disasters
    - 1. Avalanche
    - 2. Earthquake
    - 3. Emerging infectious disease
      - a. Epidemic
      - b. Pandemic
    - 4. Flood
    - 5. Heat wave
    - 6. Hurricane
    - 7. Storms
      - a. Tropical
      - b. Winter
    - 8. Tornado
    - 9. Tsunami
    - 10. Volcano
    - 11. Wildfires
  - B. Manmade disasters
    - 1. Chemical release
    - 2. Explosion
    - 3. Infrastructure incidents
    - 4. Radiation release
    - 5. Transportation accident
    - 6. Terrorism
  - C. Combination disaster
    - 1. Natural disaster – manmade disaster
- II. Disaster planning: Personal, healthcare facility, LEMA
  - A. Family and personal protection
    - 1. Research recommended procedures for local emergencies
    - 2. Create family plans for each type emergency
    - 3. Communication
      - a. No technology available
      - b. Designate meeting places

- c. Out-of-town relative as “communication center”
    - d. Emergency contact information available
      - (1) Wallet
  - 4. Go bag
  - 5. Essential supplies in home
  - 6. Provisions for pet(s)
- B. National Incident Management System (NIMS)
  - 1. Local emergency operations plan (EOP)
  - 2. All-hazards plan
- C. Incident Command Systems (ICS)
  - 1. Incident commander
  - 2. Unified command
  - 3. Chain of command
  - 4. ICS organization
    - a. Command group
      - (1) Four reporting groups
        - (a) Operations
        - (b) Planning
        - (c) Logistics
        - (d) Finance and administration
- D. Hospital emergency operations plans
  - 1. Components of plan
    - a. Scalable
      - (1) Patient surge
    - b. Mitigation
    - c. Preparedness
    - d. Response
    - e. Recovery
  - 2. Evacuating a medical facility
    - a. Evacuation plans
    - b. Moving patients
    - c. Medical records
    - d. Refrigerated medical supplies
  - 3. Hospital Incident Command System (HICS)
    - a. Clarify roles and responsibilities
    - b. Job action sheets
  - 4. Healthcare worker responsibilities
    - a. Personal responsibilities
    - b. Department role
    - c. Chain of command
    - d. Knowledge of hospital signals/codes during emergency
    - e. Procedures for communication
- E. Medical office and stand-alone out-patient surgery centers
  - 1. Procedures for communication
  - 2. Evacuation procedures

- a. Central meeting place
      - b. Methods for accounting for all personnel
    - 3. Methods for protecting patient health records
    - 4. Coordinate plan with local and regional health department
    - 5. Coordinate plan with local and regional hospitals
    - 6. Procedures to expand operations
      - a. Care for non-routine patients
      - b. High volume of patients
      - c. Provide beds/stretchers
  - F. Local Emergency Management Agencies (LEMA)
    - 1. Lead coordinating responsibility
    - 2. Emergency operations center (EOC)
- III. National disaster planning
  - A. Federal Emergency Management Agency (FEMA)
  - B. National Response Framework (NRF)
  - C. National Disaster Medical System (NDMS)
    - 1. Disaster Medical Assistance Teams (DMAT)
    - 2. Disaster Mortuary Operations Response Team (DMORT)
    - 3. National Pharmacy Response Teams (NPRT)
- IV. Immediate response to an all-hazards event
  - A. Mitigation
    - 1. Reduce potential for casualties
      - a. Electrical hazards
      - b. Chemical hazards
      - c. Fire and explosive hazards
      - d. Infrastructure hazards
      - e. Biological hazards
      - f. Radiological hazards
    - 2. Create safe zones
    - 3. Evacuation orders
    - 4. Storage of potentially hazardous items
    - 5. Communication with LEMA
    - 6. Law enforcement
      - a. Mandates, e.g. curfew orders, no entry to hazardous zone/area
    - 7. Security of family
  - B. Response
    - 1. Set up incident command site
    - 2. Establish methods for communication
    - 3. Set up triage area
    - 4. Set up decontamination area
    - 5. Prepare for special needs patients
    - 6. Point of Distribution Site (POD)
      - a. Strategic National Stockpile (SNS)
        - (1) Push packs
  - C. Risk communication with public

1. Strategies for disseminating health information to populations
  2. Barriers to communication with populations
- V. Infection control precautions
  - A. Controlling contamination
    1. Standard precautions
    2. Personal protective equipment
      - a. Protective clothing
      - b. Eye and face protection
      - c. Hand protection
      - d. Medical masks
      - e. Respirators
      - f. Hand washing without water
  - B. Decontamination patient procedures
- VI. Triage
  - A. Triage procedures
    1. Simple Triage and Rapid Treatment (START)
    2. Surgical technologist in supporting role
      - a. Basic life saving procedures
      - b. First aid
      - c. Transport patients
- VII. Issues during a disaster
  - A. Relevant moral and ethical issues
  - B. Availability of health services for all populations during a disaster
  - C. Legal issues
  - D. Regulatory issues
- VIII. Support roles of the surgical technologist during a disaster
  - A. DMAT
  - B. Evacuation teams
  - C. Specialty surgical teams, e.g. burn team
  - D. Support triage role (see VIII)
  - E. Transport patients
  - F. Volunteer
    1. Preregistration
      - a. Emergency System for the Advance Registration of Volunteer Health Professionals (ESAR-VHP)
    2. Community Emergency Response Team (CERT)



## **APPENDICES**





## **APPENDIX A**

### **Surgical Procedure Didactic Exemplars**

#### **Colon Resection**

**Objectives:** The learner will:

1. Assess the anatomy, physiology and pathophysiology of the colon.
2. Analyze the diagnostic interventions and the surgical interventions of a patient undergoing a colon resection.
3. Plan the intraoperative course for a patient undergoing colon resection.
4. Discuss the postoperative considerations for a patient undergoing a colon resection.

**Content:**

- I. Anatomy
  - A. Normal anatomy
    1. Bowel wall
      - a. Serosa
      - b. Submucosa
      - c. Mucosa
    2. Structure
      - a. Haustra
      - b. Taenia coli
      - c. Epiploic appendices
      - d. Globlet cells
    3. Points of fixation
      - a. Mesentery
      - b. Hepatic (right colic) flexure
      - c. Splenic (left colic) flexure
    4. Segments
      - a. Ileocecal valve
      - b. Cecum
      - c. Vermiform appendix
      - d. Ascending colon
      - e. Transverse colon
      - f. Descending colon
      - g. Sigmoid colon
      - h. Rectum/anus
    5. Vascular supply
      - a. Superior mesenteric artery
        - (1) Ileo-colic artery
        - (2) Right colic artery
        - (3) Middle colic artery
      - b. Inferior mesenteric artery
        - (1) Left colic artery

- (2) Sigmoid artery
      - (3) Superior rectal artery
    - c. Portal system
  - 6. Nerve supply
    - a. Celiac plexus
    - b. Vagus nerve
    - c. Nervi erigentes
    - d. Presacral plexus
  - 7. Lymphatic supply
    - a. Intramural
      - (1) Submucosal tissue
      - (2) Muscular layer of the bowel
    - b. Extramural
      - (1) Epiploic glands
      - (2) Pericolic glands
      - (3) Intermediate group
      - (4) Mesenteric artery glands
- II. Physiology
  - A. Absorption
  - B. Storage
  - C. Peristalsis
  - D. Valsalva mechanism
- III. Pathophysiology
  - A. Pseudomembranous enterocolitis
  - B. Polyps
    - 1. Morphology
      - a. Non-malignant
      - b. Malignant
    - 2. Shapes
      - a. Sessile mucosal
      - b. Adenomatous pedunculated
    - 3. Types
      - a. Polypoid adenoma
      - b. Villous adenoma
      - c. Mucous polyp
      - d. Pseudopolypsis of the colon
      - e. Familial polyposis
  - C. Mechanical lesions
    - 1. Large bowel obstruction
      - a. Band/adhesion
      - b. Malignancy
    - 2. Volvulus
    - 3. Intussusception
    - 4. Fecal impaction
  - D. Trauma
    - 1. Blunt

- 2. Penetrating
- E. Inflammatory
  - 1. Diverticulosis/diverticulitis
  - 2. Ulcerative colitis
  - 3. Crohn's disease
- F. Vascular
  - 1. Ischemic colitis
  - 2. Vascular occlusion/infarction
  - 3. A-V malformation
- IV. Diagnostic interventions
  - A. Barium enema
  - B. Chest X-ray
  - C. IVP (if renal involvement suspected)
  - D. CT scan
  - E. MRI
  - F. Sigmoidoscopy/colonoscopy
  - G. Laboratory testing
    - 1. Hemocult/guaiac
    - 2. CEA
    - 3. Electrolytes
    - 4. PT/PTT
- V. Intestinal antisepsis/bowel prep
  - A. Chemical agents
    - 1. Antibiotic therapy
    - 2. Mechanical agents
      - a. Diet
      - b. Hyperosmolar solutions
      - c. Lavage
- VI. Intervention
  - A. Anesthesia
    - 1. Epidural pain control
    - 2. General
  - B. Positioning
    - 1. Dorsal recumbent
    - 2. Modified lithotomy
  - C. Positioning aides
    - 1. Safety strap
    - 2. Arm boards
    - 3. Stirrups
      - a. Allen
      - b. Knee-crutch
      - c. String, candy-cane
  - D. Patient monitoring
    - 1. Routine vitals, BIS, CO<sub>2</sub>
    - 2. Hemodynamic
    - 3. Urinary

4. DVT prophylaxis
5. Intraoperative temperature maintenance
- E. Skin preparation
  1. Abdominal prep
  2. Perineal prep
  3. Stoma marking
- F. Draping
  1. Dorsal recumbent
    - a. 4 towels to square off incision and towel clips
    - b. Fenestrated laparotomy sheet
  2. Lithotomy
    - a. Under buttocks sheet
    - b. Leggings
- G. Incisions
  1. Vertical midline
  2. Paramedian
  3. Stoma site
- H. Supplies
  1. Routine
    - a. ESU
    - b. Suction apparatus
    - c. Light management
    - d. Sponges
    - e. Laparotomy back table pack
    - f. Sharps management
  2. Intraabdominal staplers
    - a. Ligating and dividing staplers
    - b. Anastomosis staplers
    - c. Terminal end staplers
    - d. End-to-end circular staplers
  3. Suture material
    - a. Hemostasis
    - b. Mesenteric
    - c. Bowel
    - d. Stoma
  4. Suction/tips
    - a. Poole tip
    - b. Yankauer tip
  5. Equipment
    - a. Headlight/light source
    - b. ESU generator
    - c. Harmonic Scalpel
  6. Instrumentation
    - a. General abdominal instrumentation
    - b. Abdominal retraction
    - c. Bowel clamps

- d. End-to-end circular staplers
- e. Pursestring instruments

## VII. Procedural steps

### A. Bowel resection

1. Abdominal wall is incised using the skin knife.
2. Incision is extended down to the level of the anterior fascia using the deep knife or ESU pencil; hemostasis is achieved with hemostatic forceps or ESU coagulation.
3. Incision is extended through the fascia layer with Mayo scissors or ESU; Kelly or Richardson retractor is used for exposure.
4. Muscle layer is separated bluntly along its fibers.
5. Parietal peritoneum is opened; toothed forceps or hemostats are used to lift the tissue off the viscera; incision is accomplished with deep knife or scissors; Kelly or Richardson retractor is used for exposure.
6. Abdominal cavity is explored and the pathology is identified.
7. Peritoneum is incised lateral to the colonic segment using ESU pencil or Metzenbaum scissors; retractors and moist lap sponges used for exposure.
8. Areas for resection/anastomosis are identified; mesentery is opened and a Penrose drain or hernia/umbilical tape may be placed to encircle the bowel segment.
9. Mesentery is cross clamped with two Kelly hemostatic forceps and the tissue is cut with Mayo scissors; hemostasis is achieved with sutures of the surgeons' preference or division and hemostasis is accomplished using the internal anastomosis stapling device.
10. "Bowel technique" is used to isolate any instruments and supply which contact bowel mucosa or luminal contents.
11. Bowel segments are transected using either non-crushing bowel clamps on the non-specimen side of the bowel and crushing clamps on the specimen side with incision accomplished with the knife or use of the internal anastomosis stapling device with cutting bar.
12. The bowel segments are anastomosed.
  - a. By hand- end-to-end
    - (1) Traction sutures are placed to align the mesenteric borders; non-absorbable, interrupted mattress stitches are used and tagged with hemostats
    - (2) Serosa layer of the posterior wall of the bowel is closed; non-absorbable, interrupted mattress stitches are used

- (3) Starting on the middle posterior wall of the mucosa layer, the mucosa layer is closed using an absorbable, running stitch – double armed or two, single-armed stitches.
    - (4) Serosa layer of the anterior wall of the bowel is closed in the same fashion as the posterior wall.
  - b. Mechanically – side-to-side anastomosis
    - (1) Small colostomy is made in the staple line across the lumen of each bowel loop
    - (2) One arm of the internal anastomosis staplers is placed into each bowel loop; the device is closed and fired.
    - (3) Allis clamps are used to grasp sides of the colostomy created by the stapler
    - (4) Terminal end stapler is applied and the excess bowel is trimmed with the skin knife or scissors
  - c. Mechanically – end-to-end anastomosis
    - (1) Running, pursestring stitch of non-absorbable, monofilament suture is placed around the end of each bowel loop
    - (2) A colostomy is performed close to the anastomosis site
    - (3) End-to-end circular stapler is introduced; the jaw is opened and the pursestring sutures are tightened and secured around the anvil of the stapler
    - (4) Stapler is fired; opened slightly, rotated through the anastomosis site and removed
    - (5) The “ring” specimens of the stapler are checked for integrity of the anastomosis
    - (6) Allis clamps are placed along the colostomy and a terminal end stapler is applied to close the colostomy; excess bowel is trimmed with the skin knife or scissors
- 13. Mesenteric defect is closed with an absorbable running suture
- 14. Abdominal cavity is irrigated with copious amount of saline for irrigation
- 15. Abdominal incision is closed
  - a. Fascia layer is closed with two, absorbable running sutures of the surgeon’s preference





- IX. Catheters/drains**
  - A. Foley indwelling urinary drainage**
    - 1. Intraoperatively**
      - a. Fluid intake/output monitoring**
      - b. Decompress bladder**
    - 2. Post-operatively**
      - a. Fluid intake/output monitoring**
      - b. Decompress bladder**
  - B. Closed wound drainage**
    - 1. Contaminated wound intraoperatively**
      - a. Drain**
      - b. Reservoir**
      - c. Anchoring stitch**
- X. Dressings**
  - A. 4X4s or ABD**
  - B. Stoma dressing**
    - 1. Vaseline gauze**
    - 2. Stoma appliance**
- XI. Specimen**
  - A. Bowel segment**
    - 1. Frozen section**
    - 2. Permanent section**
    - 3. EEA “donuts”**
- XII. Destination**
  - A. PACU**
  - B. ICU**
- XIII. Special considerations**
  - A. Concepts of “bowel technique”**
  - B. Stoma management**
- XIV. Prognosis**
  - A. Primary/localized**
  - B. Metastasis to mesentery**
  - C. Metastasis to distant tissues**
- XV. Complications**
  - A. DVT**
  - B. Short-gut syndrome**
  - C. Wound infection**
  - D. Ischemic bowel/mesenteric infarct**
  - E. Anastomosis rupture**
  - F. Hemorrhage**
- XVI. Wound management and classification**
  - A. Class II – controlled spillage**
  - B. Class III – non-controlled spillage**
  - C. Class IV – frank pus/infection**

## Cesarean Section

**Objectives:** The learner will:

1. Assess the anatomy, physiology, and pathophysiology of the female reproductive system.
2. Analyze the diagnostic and surgical interventions for a patient undergoing cesarean section.
3. Plan the intraoperative course for a patient undergoing a cesarean section.
4. Assemble supplies, equipment and instrumentation needed for the procedure.
5. Choose the appropriate patient position.
6. Identify the incision used for the procedure.
7. Analyze the procedural steps for a cesarean section.
8. Describe the care of the specimen.
9. Discuss the postoperative considerations for a patient undergoing cesarean section.

**Content:**

- I. Anatomy
  - A. Pelvis
    1. Ilium
    2. Ischium
    3. Symphysis pubis
    4. Sacrum
    5. Coccyx
  - B. Pelvic floor
    1. Levator ani muscle
    2. Iliococcygeal
    3. Pubococcygeal
    4. Puborectalis
    5. Pelvic fascia
  - C. Pelvic cavity
    1. Uterus
      - a. Tissue layers
        - (1) Endometrium
        - (2) Myometrium
        - (3) Peritoneal or pelvic peritoneum/serous layer
      - b. Uterine vascularity
        - (1) Uterine artery
        - (2) Uterine veins
      - c. Cervix
        - (1) Internal os
        - (2) External os
      - d. Ligaments

- (1) Broad
    - (2) Cardinal
    - (3) Pubic
    - (4) Sacral
    - (5) Round
    - (6) Uterosacral
    - (7) Infundibulopelvic (suspensory)
  - 2. Fallopian tubes
    - a. Fimbria
    - b. Infundibulum
    - c. Ampulla
    - d. Mesosalpinx
  - 3. Ovaries
    - a. Ovarian ligament
    - b. Ovarian vasculature
    - c. Cortex
    - d. Medulla
    - e. Ova
  - 4. Vagina
    - a. Vaginal mucosa
  - 5. External genitalia
    - a. Vulva
    - b. Mons pubis
    - c. Labia majora
    - d. Labia minora
    - e. Clitoris
    - f. Bartholins glands
    - g. Vestibule
    - h. Urethral meatus
    - i. Vascularization
      - (1) Pudendal artery
    - j. Nerve innervation
      - (1) Pudendal nerve
- D. Vascular, nerve, and lymphatic supply of the pelvic cavity
  - 1. Blood supply
    - a. Internal iliac artery
    - b. Common iliac artery
    - c. Ovarian artery
    - d. Superior rectal artery
    - e. Median sacral artery
  - 2. Nerve supply
    - a. Autonomic nervous system
      - (1) Superior hypogastric plexus (presacral nerve)
  - 3. Lymphatic supply
    - a. Iliac nodes

- b. Preaortic nodes
    - c. Inguinal glands
- II. Physiology
  - A. Uterus
    - 1. Menstruation
    - 2. Contains fetus
  - B. Fallopian tubes
  - C. Ovaries
    - 1. Ova maturation
    - 2. Hormone production
      - a. Estrogen
      - b. Progesterone
      - c. Human chorionic gonadotropin
  - D. Vagina
- III. Pathophysiology
  - A. Repeat cesarean section
  - B. Cephalopelvic disproportion (CPD) (dystocia)
  - C. Malpresentation
  - D. Fetal distress
  - E. Failure to progress
  - F. Maternal hemorrhage
    - 1. Placenta previa
    - 2. Abruptio placentae
  - G. Maternal medical problems
    - 1. Diabetes
    - 2. Toxemia (pre-eclampsia)
    - 3. Hypertension
    - 4. Pelvic tumor
    - 5. Invasive cervical cancer
    - 6. Active genital herpes
    - 7. Repaired vesico-vaginal fistula
    - 8. Urinary sling operation
  - H. Prolonged labor
  - I. Failed induction
  - J. Conjoined twins
  - K. Death of the mother
  - L. Major congenital fetal anomalies
  - M. Immune thrombocytopenia
  - N. Prior vaginal colporrhaphy
  - O. Large vulvar condylomata
  - P. Prolapsed cord
  - Q. Previous pelvic surgery
  - R. Trauma
  - S. Cardiac disease
  - T. Multiple pregnancies
  - U. Breech presentation

- IV. Diagnostic intervention
  - A. Previous medical history
  - B. Ultrasound
  - C. Fetal monitoring
  - D. Vaginal cultures
  - E. Scalp pH
  - F. Laboratory tests
    - 1. CBC
    - 2. Urinalysis
- V. Intervention
  - A. Anesthesia
    - 1. Epidural
    - 2. Spinal
    - 3. General
    - 4. Local
  - B. Positioning
    - 1. Supine with wedge on right side
    - 2. Positioning aids
      - a. Safety straps
      - b. Arm boards
  - C. Patient monitoring
    - 1. Fetal monitoring
    - 2. Doppler
    - 3. Vital signs
    - 4. Hemodynamic
    - 5. Urinary Foley
    - 6. Temperature maintenance
  - D. Skin preparation
    - 1. Abdominal prep
  - E. Draping
    - 1. 4 towels to square off incision/non-perforating towel clips
    - 2. Fenestrated sheet w/ fluid collection pouch
  - F. Incisions
    - 1. Skin
      - a. Midline
      - b. Pfannenstiel (low transverse)
    - 2. Uterus
      - a. Classical
      - b. Kerr (low transverse)
      - c. T-incision (not common)
  - G. Supplies
    - 1. ESU
    - 2. Light management
    - 3. Lap sponges
    - 4. Sharps management
    - 5. Bulb syringe (one per infant)

6. Cord pH kit (one per infant)
  7. Cord clamps (two per infant)
  8. Delee suction device
  9. Additional suction tubing
  10. Delivery forceps (if not routine in instrument set)
  11. Bandage scissors (if not routine in instrument set)
  12. Cord blood tubes
  13. Suture material
    - a. Hemostasis
    - b. Uterus
    - c. Bladder flap
  14. Suction tips
    - a. Poole tip
    - b. Yankauer tip
    - c. Delee suction device
- H. Equipment**
1. ESU generator
  2. Radiant warmer (one per infant)
  3. K-thermia unit
  4. Fetal monitoring device
    - a. Ultrasound
    - b. Doppler
- I. Instrumentation**
1. Cesarean section tray
  2. Surgeon preference for bladder blade
    - a. Delee
    - b. Richardson
    - c. Balfour blade
- J. Intervention**
1. Abdominal wall incision
    - a. Instruments
      - (1) Knife blade
        - (a) Skin knife
        - (b) Deep knife
        - (c) Uterine knife
      - (2) Russian or toothed forceps
      - (3) Retractors of surgeon's preference
    - b. Tissues
      - (1) Skin
      - (2) Subcutaneous
      - (3) Fascia
      - (4) Muscle
      - (5) Peritoneum
      - (6) Bladder peritoneum
      - (7) Uterus
      - (8) Amniotic sac (if still intact)

2. Intraoperative intervention
  - a. Abdomen entered
    - (1) Most laps
    - (2) Kelly or Richardson retractors
  - b. Parietal peritoneum dissected
    - (1) Metzenbaum scissors
    - (2) Russian forceps
  - c. Uterine incision scored lengthwise
    - (1) New knife blade
  - d. Incision carried bilaterally
    - (1) Blunt dissection – fingers
    - (2) Sharp dissection – bandage scissors
  - e. Rupture of amniotic sac
    - (1) Allis clamp
  - f. Obstetrician delivers infant
  - g. Cord is clamped
    - (1) Cord clamps
    - (2) Pean clamps
    - (3) Kelly clamps
  - h. Infant suctioned
    - (1) Delee suction
    - (2) Bulb syringe
  - i. Neonate passed to pediatrician/neonate team
  - j. Cord blood sample collected
    - (1) Cord blood tube
  - k. Placenta delivered and inspected
    - (1) Cord pH drawn
      - (a) Cord pH kit
  - l. Clean uterine cavity
    - (1) Dry lap sponges
  - m. Oxytocin uterine injection
3. Tissue approximation
  - a. Uterus
    - (1) Single or multiple layer closure
    - (2) Imbricating stitch
  - b. Bladder flap
  - c. Peritoneum
  - d. Muscle
  - e. Fascia
  - f. Subcutaneous
  - g. Skin

- K. Counts**
1. Initial
  2. Uterus
  3. Peritoneum
  4. Skin

- L.** Catheters and drains
  - 1.** Foley catheter
- M.** Closed wound drains
  - 1.** Jackson-Pratt (not common)
- N.** Dressings
  - 1.** Telfa
  - 2.** 4 x 4s
  - 3.** ABD
- O.** Specimen
  - 1.** Placenta
  - 2.** Cord bloods
- P.** Destination
  - 1.** PACU
- Q.** Special considerations
  - 1.** May use oxytocic (pitocin, oxytocin, prostaglandins, methergine)
  - 2.** If general anesthetic used, preparations completed prior to induction
    - a.** Skin prep
    - b.** Bladder drainage
    - c.** Draping
    - d.** Suction connection
    - e.** Counts
    - f.** Gowning and gloving
  - 3.** Three closing counts
- R.** Prognosis
  - 1.** Maternal
    - a.** Return to normal activities
    - b.** Increased risk of future cesarean section
  - 2.** Neonate
    - a.** Prognosis depends on non-surgical factors
- S.** Complications
  - 1.** Bleeding
  - 2.** SSI
  - 3.** Injury to adjacent organs
  - 4.** Cesarean section weakens musculature; may result in future cesarean sections





## **APPENDIX B**

### **Recommended Lab Skill Assessments**

#### **Surgical Technologist in the First Scrub Role**

##### **Preoperative**

1. Donning OR attire
2. Basic handwash
3. Back table
  - a. Open sterile pack
  - b. Arrange supplies and instruments
  - c. Assemble a Balfour abdominal retractor
4. Open a sterile basin on ringstand
5. Instrument set
  - a. Open wrapped set
  - b. Open container system
  - c. Remove instrument set from container system
6. Open sterile supplies
  - a. Small wrapped package placed onto sterile field
  - b. Small wrapped package secured by surgical technologist
  - c. Peel pack
7. Pour sterile solution
8. Surgical scrub
9. Gown and glove self
10. Mayo stand set-up
  - a. Drape
  - b. Arrange instruments and supplies
  - c. Construct a sponge stick
  - d. Load and unload scalpel blade on scalpel handle
11. Suture and ties
  - a. Transfer suture packets to the sterile back table
  - b. Straighten sutures
  - c. Cut ties in  $\frac{1}{4}$ ,  $\frac{1}{3}$  and  $\frac{1}{2}$  lengths
12. Fill bulb syringe
13. Draw up medications
  - a. Vial held by circulator
  - b. Receive medication(s) onto sterile field
  - c. Label medications
14. Gown and glove another person
15. Drape patient
  - a. Laparotomy
  - b. Vagina
  - c. Extremity – leg

**Intraoperative**

1. Recognize, prepare and pass instruments
2. Suture and Ties
  - a. Load and pass NH swaged needle: right- and left-handed surgeon
  - b. Load free needle onto NH; thread suture; pass and reload
  - c. Tag and cut sutures
  - d. Pass ties: free hand; instrument
3. Contaminated sterile attire
  - a. Re-glove
  - b. Re-gown

**Postoperative**

1. Dressings
  - a. Assemble and apply abdominal dressings
  - b. Assemble and apply a Montgomery strap dressing
2. Connect ostomy bag to stoma site
3. Drains
  - a. Connect Hemovac®
  - b. Connect Jackson-Pratt®
  - c. Connect chest tube to chest drainage system
4. Remove sterile gown and gloves
5. Disinfecting OR
  - a. End of case
  - b. Terminal

**Perioperative**

1. Sponge, sharp and instrument counts

**Assistant Circulator Role**

1. Turn and tie sterile gown
2. Transporting patient
  - a. Prepare patient stretcher
  - b. Transport patient from ward room to preop. holding or OR
3. Transferring Patient
  - a. Stretcher to OR table
  - b. OR table to stretcher
4. Taking vital signs
  - a. Temperature
  - b. Pulse
  - c. Respirations
  - d. Blood Pressure
5. Electrosurgery
  - a. Position grounding pad
  - b. Connect Bovie pencil cord to ESU
  - c. Complete ESU checklist

6. Sellick's Maneuver
7. Positioning patient
  - a. Supine
  - b. Lateral
  - c. Prone
8. Urinary catheterization
  - a. Straight catheter a male
  - b. Straight catheter a female
  - c. Foley urinary catheterization – male and female
9. Position a pneumatic tourniquet cuff
10. Patient skin prep
  - a. Abdomen
  - b. Vagina
  - c. Extremity
11. Connect suction
12. Documentation
  - a. Lab test requisition
  - b. Pathology – specimen

#### **Disinfection and Sterilization**

1. Hand wash instruments
2. Disinfect an endoscope
3. Assemble an instrument set
4. Packaging items for sterilization
  - a. Peel pack
  - b. Container system
  - c. Envelope fold wrap
  - d. Square fold wrap
5. Operate steam sterilizer
  - a. Flash
  - b. Routine
6. Operate Sterrad Steris™ System



## APPENDIX C

### Teaching Methodologies

#### **Domains of Learning**

Beginning in 1948, a group of educators began the task of classifying a taxonomy of education goals and objectives. Their intention was to develop a classification system for educators to assist them in specifying learning objectives and, therefore, enhance the planning of learning experiences and the creation of evaluative tools. Bloom's group identified the three domains of education as the cognitive, affective, and psychomotor domains. Each of the three domains identifies general areas of learning acquisition and demonstration arranged in a hierarchy of simple to complex. Using the taxonomy, the learner can demonstrate learning on a variety of levels. The higher the level of taxonomy used during the educational process, the more likely it is that the learner will retain the information or skill.

#### **The Cognitive Domain**

The cognitive domain deals with the student's recall or recognition of knowledge, in other words, the intellectual development of the learner.

Knowledge is the ability to recall previously learned specifics, methods, patterns, processes or universals (eg terminology, categories and criteria). Knowledge attainment is verified using who, what, when and where questions. Verbs associated with learning at this level include arrange, cite, define, describe, duplicate, identify, know, label, list, match, memorize, name, order, outline, pronounce, quote, recall, recite, recognize, relate, repeat, reproduce, select, state, and write.

Comprehension is the ability to grasp the meaning of material or to deal with problems, such as organizing or reorganizing information (eg translation, interpretation and extrapolation). Verbs associated with learning at this level include alter, change, classify, comprehend, convert, defend, depict, describe, discover, discuss, distinguish, estimate, explain, express, extend, generalize, give examples, give the main idea, identify, illustrate, indicate, infer, interpret, locate, manage, paraphrase, predict, recognize, relate, rephrase, represent, report, restate, review, rewrite, reword, select, substitute, summarize, translate and vary.

Application is the ability to use learned material in a new and concrete situation (eg applying knowledge from one situation to a different but similar situation). Knowledge attainment is verified using how many, which, what is, and write an example questions. Verbs associated with learning at this level include apply, change, choose, classify, compute, construct, demonstrate, direct, discover, dramatize, employ, illustrate, interpret, manifest, manipulate, modify, operate, practice, predict, prepare, present, produce, relate, schedule, show, sketch, solve, use, utilize and write.

Analysis is the ability to break material into its elements or parts (eg analysis of elements, relationships and organizational principles). Knowledge attainment is verified using why questions. Verbs associated with learning at this level include analyze, appraise, ascertain, associate, break down, calculate, categorize, compare, conclude, contrast, criticize, designate, determine, diagnose, diagram, differentiate, discriminate, dissect, distinguish, divide, examine, experiment, find, identify, illustrate, infer, outline, point out, question, reduce, relate, select, separate and test.

Synthesis is the ability to put elements together into a new whole as in a pattern or structure not present before (eg produce a new plan, operation or derive a new set of abstract relations). Knowledge attainment is verified using how can we improve, what would happen if, and how can we solve questions. Verbs associated with learning at this level include arrange, assemble, categorize, collect, combine, compile, compose, conceive, construct, create, design, develop, devise, expand, explain, extend, formulate, generalize, generate, hypothesize, integrate, invent, manage, modify, organize, originate, plan, prepare, pose, project, propose, rearrange, reconstruct, relate, reorganize, revise, rewrite, set up, summarize, synthesize, tell, theorize and write.

Evaluation is the ability to make judgments about the value of materials and methods (eg to make quantitative and qualitative judgments using either an external or one's own standard). Verbs associated with learning at this level include appraise, argue, assess, attach, choose compare, conclude, contrast, criticize, critique, deduce, defend, describe, discriminate, estimate, evaluate, explain, interpret, judge, justify, predict, rate, recommend, relate, select, summarize, support, use, value and weigh.

### **The Psychomotor Domain**

The psychomotor domain deals with the manipulation of materials and equipment, in other words, motor skills. The advancing levels of performance of a technique or procedure are reached by meeting objectives in this area. Two organizational outlines are currently in use. They include the work of Dave and Simpson.

#### **Dave's Taxonomy (1970)**

Imitation is the ability to perform following demonstration (eg the ability to copy).

Manipulation is the ability to perform according to instruction rather than observation only (eg following oral or written directions or procedures).

Precision is the ability to perform the skill with accuracy and completeness, independent of a model or set of directions (eg independent efficient performance).

Articulation is the ability to perform a skill or procedure with competency within a reasonable time frame and according to procedure.

Naturalization is the ability to perform the skill automatically and efficiently as an integrated part of practice.

## SIMPSON'S TAXONOMY

PERCEPTION IS THE ABILITY TO USE SENSORY CUES TO GUIDE MOTOR ACTIVITY. THIS RANGES FROM SENSORY STIMULATION, THROUGH CUE SELECTION, TO TRANSLATION. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE CHOOSE, DESCRIBE, DETECT, DIFFERENTIATE, DISTINGUISH, IDENTIFY, ISOLATE, RELATE AND SELECT.

SET REFERS TO THE READINESS TO ACT. IT INCLUDES MENTAL, PHYSICAL, AND EMOTIONAL SETS. THESE THREE SETS ARE DISPOSITIONS THAT PREDETERMINE ONE'S RESPONSE TO DIFFERENT SITUATIONS (SOMETIMES CALLED MINDSETS). THESE ACTIVITIES INCLUDE RECOGNIZING ONE'S ABILITIES AND LIMITATIONS AND SHOWING A DESIRE TO LEARN A NEW PROCESS (MOTIVATION). NOTE: THIS SUBDIVISION OF THE PSYCHOMOTOR DOMAIN THAT IS CLOSELY RELATED TO THE "RESPONDING TO PHENOMENA" SUBDIVISION OF THE AFFECTIVE DOMAIN. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE BEGIN, DISPLAY, EXPLAIN, MOVES, PROCEED, REACT, SHOW, STATE AND VOLUNTEER.

GUIDED RESPONSE OCCURS IN THE EARLY STAGES IN LEARNING A COMPLEX SKILL THAT INCLUDES IMITATION AND TRIAL AND ERROR. ADEQUACY OF



PERFORMANCE IS ACHIEVED BY PRACTICING. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE COPY, TRACE, FOLLOW, REACT, REPRODUCE AND RESPOND.

MECHANISM IS THE INTERMEDIATE STAGE IN LEARNING A COMPLEX SKILL. LEARNED RESPONSES HAVE BECOME HABITUAL AND THE MOVEMENTS CAN BE PERFORMED WITH SOME CONFIDENCE AND PROFICIENCY. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE ASSEMBLE, CALIBRATE, CONSTRUCT, DISMANTLE, DISPLAY, FASTEN, FIX, GRIND, HEAT, MANIPULATE, MEASURE, MEND, MIX, ORGANIZE AND SKETCH.

COMPLEX OVERT RESPONSE IS THE SKILLFUL PERFORMANCE OF MOTOR SKILLS THAT INVOLVE COMPLEX MOVEMENT PATTERNS. PROFICIENCY IS INDICATED BY A QUICK, ACCURATE AND HIGHLY COORDINATED PERFORMANCE THAT REQUIRES A MINIMUM OF ENERGY. THIS CATEGORY INCLUDES PERFORMING WITHOUT HESITATION AND AUTOMATIC PERFORMANCE. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE ASSEMBLE, BUILD, CALIBRATE, CONSTRUCT, DISMANTLE, DISPLAY, FASTEN, FIX, GRIND, HEAT, MANIPULATE, MEASURE, MEND, MIX, ORGANIZE AND SKETCH. NOTE: THE KEY WORDS ARE THE SAME AS “MECHANISM”, BUT WILL HAVE ADVERBS OR ADJECTIVES THAT INDICATE THAT THE PERFORMANCE IS QUICKER, BETTER, MORE ACCURATE, ETC.

ADAPTATION INDICATES THAT SKILLS ARE WELL DEVELOPED AND THE INDIVIDUAL CAN MODIFY MOVEMENT PATTERNS TO FIT SPECIAL REQUIREMENTS, SUCH AS RESPONDING EFFECTIVELY TO UNEXPECTED

EXPERIENCES. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE ADAPT, ALTER, CHANGE, REARRANGE, REORGANIZE, REVISE AND VARY.

ORIGINATION IS THE CREATION OF NEW MOVEMENT PATTERNS TO FIT A PARTICULAR SITUATION OR SPECIFIC PROBLEM. LEARNING OUTCOMES EMPHASIZE CREATIVITY BASED UPON HIGHLY DEVELOPED SKILLS. VERBS ASSOCIATED WITH LEARNING AT THIS LEVEL INCLUDE ARRANGE, BUILD, COMBINE, COMPOSE, CONSTRUCT, CREATE, DESIGN, INITIATE, MAKE AND ORIGINATE.

### **The Affective Domain**

The affective domain deals with the student's feelings, attitudes, and values for the field of study; in other words, the student's degree of acceptance and/or rejection of the information or subject. In developing objectives in this area, the instructor would be attempting to create an atmosphere that will allow the student to develop a desired feeling or attitude. Although objectives in this area are more difficult to identify, teach, and evaluate, it is generally recognized that the affective area is integral to the student's overall education.

This domain relates to emotions, attitudes, appreciation and values such as enjoying, conserving, respecting and supporting. Verbs applicable to the affective domain include accepts, attempts, challenges, defends, disputes, joins, judges, praises, questions, shares, supports, and volunteers.

Receiving (attending) is the awareness and willingness to pay attention (eg sensory awareness, attention with some discrimination). Verbs associated with learning at this level include ask, choose, describe, erect, follow, give, hold, identify, locate, name, point to, select, sit, reply and use.

Responding is the willingness or motivation to become involved and respond (eg willingness to follow rules, enjoyment in participating, voluntary responses). Verbs associated with learning at this level include answer, assist, aid, complies, conform, discuss, greet, help, label, perform, practice, present, read, recite, report, select, tell and write.

Valuing is the identification of worth and use of values (eg acceptance of a value, preference for a value, commitment to a value). Verbs associated with learning at this level include complete, demonstrate, differentiate, explain, follow, form, initiate, invite, join, justify, propose, read, report, select, share, study and work.

Organization involves the placement of values into a system (eg the classification and interrelationship of values that establish a value system). Verbs associated with learning at this level include adhere, alter, arrange, combine, compare, complete, defend, explain, formulate, generalize, identify, integrate, modify, order, organize, prepare, relate and synthesize.

Characterization involves consistent behavior with internalized values and systems (eg the integration of beliefs, ideas, and attitudes into a total view that results in behavior that others will identify or “characterize” as being that of a surgical technologist). Verbs associated with learning at this level include act, discriminate, display, influence, listen, modify, perform, practice, propose, qualify, question, revise, serve, solve and verify.

Affective domain verb definitions include the following:

**Apply a rule:** To state a rule as it applies to a situation, object or event that is being analyzed. The statement must convey analysis of a problem situation and/or its solution, together with the name or statement of the rule that was applied.

**Classify:** To place objects, words, or situations into categories according to defined criteria for each category. The criteria must be made known to the student.

**Compose:** To formulate a written composition in written, spoken, musical or artistic form.

**Construct:** To make a drawing, structure, or model that identifies a designated object or set of conditions.

**Define:** To stipulate the requirements for inclusion of an object, word, or situation in a category or class. Elements of one or both of the following must be included: (1) The characteristics of the words, objects, or situations that are included in the class or category. (2) The characteristics of the words, objects, or situations that are excluded in the class or category. To define is to set up criteria for classification.

**Demonstrate:** The student performs the operations necessary for the application of an instrument, model, device, or implement. NOTE: There is a temptation to use the word “demonstrate” in objectives such as, “the student will demonstrate his knowledge of vowel sounds.” As the verb is defined, this is improper use of it.

**Describe:** To name all of the necessary categories of objects, object properties, or event properties that are relevant to the description of a designated situation. The objective is of the form, “The student will describe this order, object, or event,” and does not limit the categories that may be used in mentioning them. Specific or categorical limitations, if any, are to be given in the performance standards of each objective.

**Diagram:** To construct a drawing with labels and with a specified organization or structure to demonstrate knowledge of that organization or structure. Graphic charting and mapping are types of diagramming, and these terms maybe used where more exact communication of the structure of the situation and response is desired.

**Distinguish:** To identify under conditions when only two contrasting identifications are involved for each response.

**Estimate:** To assess the dimension of an object, series of objects, event or condition without applying a standard scale or measuring device.

**Evaluate:** To classify objects, situations, people, conditions, etc., according to defined criteria of quality. Indication of quality must be given in the defined criteria of each class category. Evaluation differs from general classification only in this respect.

**Identify:** To indicate the selection of an object of a class in response to its class name, by pointing, picking up, underlining, marking, or other responses.

**Interpret:** To translate information from observation, charts, tables, graphs, and written material in a verifiable manner.

**Locate:** To stipulate the position of an object, place, or event in relation to other specified objects, places, or events. Ideational guides to location such as grids, order arrangements and time may be used to describe location. Note: Locate is not to be confused with 'identify'.

**Measure:** To apply a standard scale or measuring device to an object, series of objects, events, or conditions, according to practices accepted by those who are skilled in the use of the device or scale.

**Name:** To supply the correct name, in oral or written form for an object, class of objects, persons, places, conditions, or events which are pointed out or described.

**Order:** To arrange two or more objects or events in accordance with stated criteria.

**Predict:** To use a rule or principle to predict an outcome or to infer some consequence. It is not necessary that the rule or principle be stated.

**Reproduce:** To imitate or copy an action, construction, or object that is presented.

**Solve:** To effect a solution to a given problem, in writing or orally. The problem solution must contain all the elements required for the requested solution, and may contain extraneous elements that are not required for solution. The problem must be posed in such a way that the student able to determine the type of response that is acceptable.

**State a rule:** To make a statement that conveys the meaning of the rule, theory or principle.

**Translate:** To transcribe one symbolic form to another of the same or similar meaning.

## **Conclusion**

While all three domains of learning are reflected in the objectives throughout the *Core Curriculum*, it was not possible to include all levels of learning within the parameters of this publication. Individual instructors are expected to build on and further define the objectives that are included, adding their own unique objectives that address each of the domains so that the student's experience will be comprehensive.

## **Resources:**

<http://www.nwlink.com/~donclark/hrd/bloom.html>

[http://www.odu.edu/educ/roverbau/Bloom/blooms\\_taxonomy.htm](http://www.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm)

<http://www.teachers.ash.org.au/researchskills/dalton.htm>

<http://www.edpsycinteractive.org/topics/cogsys/bloom.html>

## **Learning Styles**

Learning styles theory of education focuses on the fact that individuals learn in different ways, process information in different ways, and prefer different learning styles. The learning styles theory implies that all students are capable of learning and that educational success has more to do with whether or not the educational experience is geared toward their particular style of learning than whether or not they are "smart." Learning style is a person's internal methods for processing information, feeling, as well as behaving in learning situations

The learning styles theory is based on research that assesses the way that learning is affected by heredity, upbringing, current environmental demands, and instructional methods that the individual has been most frequently exposed to in the classroom. Some of the learning styles that have been identified include:

- Hands-on
- Auditory (lecture)
- Visual
- Problem-solving
- Reading
- Group
- Individual
- Outline or numbered steps
- Intuitive

Many individuals prefer a combination of several learning approaches while others prefer only one or two approaches because that is the only way in which they have experienced learning. These students may have experienced teachers that primarily lectured or incorporated visual aids only; consequently, that is their learning preference.

Educators should emphasize teaching methods that address as many of the learning styles as possible. However, just like the learners themselves, instructors tend to teach the way that they learned. The instructor has a tendency to think that if they learned a certain way, then the students in their classroom should learn the same way. Consequently, teaching styles are intricately related to learning styles. Trying new teaching methods forces the instructor to leave their comfort zone.

The utilization of differing learning styles will add a dynamic aspect to the classroom while addressing the needs of differing learners. Research has shown two important aspects of learning styles related to teaching strategies:

1. Learning a new teaching strategy that incorporates differing learning styles requires the learners to possess those skills that are necessary to relate to the new approach to teaching.
2. If the environment and the student are too much in harmony, the student is permitted to operate at a level of comfort that does not challenge the student in the classroom. For students to grow in the classroom, the instructor should create a certain level of discomfort. The instructor accomplishes this with a variety of instructional methods, including the use of visual, auditory, and kinesthetic activities. The instructor's task is not only to address the various learning styles, but also to expose the students to new teaching modalities that will, for a short time, create some discomfort for the student. Instructors can employ a variety of assessment techniques, focusing on the development of "whole brain" capacity and each of the different learning styles.

### **Resources**

Smith RM. *Learning How to Learn: Applied Learning Theory for Adults*. New York, NY: Cambridge Books; 1982.

<http://www.learning-styles-online.com/>

[http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Learning\\_Styles.html](http://www4.ncsu.edu/unity/lockers/users/f/felder/public/Learning_Styles.html)

<http://www.mindtools.com/mneme1sty.html>

### **Master Curriculum Development**

The master curriculum – the documentation of your organization's educational process – is indeed the backbone of your surgical technology program. It is the strength of any educational process. Many individuals tend to think that master curriculum development is the creation of the course syllabus. However, it is much more than that, encompassing the whole teaching process from developing a working philosophy of education based on belief statements, to the basics, such as physical arrangement of the classroom. Master curriculum development is a comprehensive process that facilitates the establishment and analysis of the program's purpose, designs a program, coordinates a series of related activities, and aids in the evaluation of the process. This clearly establishes basic tasks, one of which is the development of the syllabus. In turn,

the syllabus distinguishes a quality master curriculum from a haphazard, accidental curriculum. The following information focuses briefly on the overall aspects of master curriculum development and more specifically on the course syllabus in which the terms, scope, sequence, and balance are given more meaning.

Every surgical technology program should have an independently developed master curriculum, reflecting the methods and practices of that particular institution. To become accredited or to maintain accreditation, your school must provide faculty and students with “a clear description of the program and its content, including learning goals, course objectives, supervised clinical practice assignments and competencies required for graduation”. This includes the course syllabus that describes learning objectives. In addition, your school must show documented student evaluation and periodic program evaluation as part of the accreditation process.

The master curriculum is a guiding tool for planning the details of the education process, so students can learn in an organized, orderly and sequenced manner. A master curriculum guides the program in a number of ways. First, the curriculum organizes program objectives into groups of like information or informational focuses. From these focuses, the faculty can develop courses that assist and support the program’s overall educational objectives.

A master curriculum also guides in the area of informational sequencing. Basic or introductory information can be assigned as prerequisites or entry-level courses so the instructional method advances from simple to complex.

A master curriculum guides and focuses the instructor or instructional team, enabling them to support and accomplish the overall educational goals of the program. It also encourages consistency in the information presented during the learning process. Standardization of topic presentations assures that each instructor is aware of the required information and objectives of a given course. Without this consistency in the educational process, a school can not ensure a comprehensive knowledge base and presentation, because positive overall program assessment and outcomes would be difficult to measure and interpret.

Once the master curriculum is developed, it should be validated by representatives of industry and business, advisory boards, a consultant or an accreditation process. Validation provides one source of feedback to assure that the materials are both current and comprehensive. Curriculum review should be performed periodically to assure timeliness of the concepts and comprehensiveness of the material. This is particularly true in the field of surgical technology where the technology information base evolves at a rapid pace. Through evolution and revision of the curriculum, faculty can incorporate successful teaching methodologies, leading to more professional and skilled students. Continued evaluation and revision will provide a tool that accurately reflects the practices of today’s allied health arena and teaches that information using the most successful means available.

Even though voluminous, a master curriculum should be a dynamic tool – one easily changed and updated. A program's master curriculum contains three areas of documentation development – the program overview, the course syllabus, and the course lesson plan.

### **The Overview**

A program overview should be developed first. The overview contains basic components, written to reflect the broad nature of the educational process. The format for developing a program overview should follow the same format prescribed by similarly focused programs within your institution.

The program title and institutional division, if applicable, is listed first. The curriculum title reflects the name or classification of the profession being educated. This is followed by a program summary – a “thumbnail sketch” of the length, goals and the general means used to accomplish these goals. The condition maybe formulated as an overall statement, such as, “Upon the completion of the didactic and clinical components, the graduate will be able to....” The performance addresses the target population, usually referred to as the learner or the graduate, in the area of information or skill to be demonstrated. An action verb should detail the type of learning that will occur. Examples of action verbs commonly used in a surgical technology curriculum include perform, demonstrate, prepare, describe, apply, identify, differentiate and complete. The standard is defined as a means to indicate how well the performance is to be demonstrated in order to qualify as successful.

Performance objectives should include focuses and skills in the three domains of learning: cognitive or knowledge, understanding and thinking skills; psychomotor or manipulative, hands-on skills; and affective skills or interests, attitudes, appreciation and values. These master objectives will later become the springboard for the development of courses and lesson plans.

The program overview, in an abbreviated form, may be published in the institution's catalogue or informational brochure. All students entering the program of study should be provided with this information prior to being admitted to the program, or during the orientation period. This document serves to provide the student with insight into the educational focus of the program and instructional methodologies used to assist him or her in gaining knowledge and skills.

### **Clusters and Syllabi**

Program course listings are used to divide program objectives into specific, clearly defined areas of focus. Programs may choose to cluster topics in several ways: time, topic or task progression. When using time, each course covers a percentage of all the information and/or skills defined in the program overview (eg Surgical Tech I, II, III and IV). Programs may cluster by topic, such as Pharmacology, Operating Room Techniques, and Perioperative Issues. Programs may also use task progression (simple to complex) to form a cluster (eg Principles of OR Practice and Advanced Principles of OR Practice).



However clusters are divided, each segment of the program objective must be defined by the cognitive, psychomotor and affective skills presented. Information must be presented in a simple-to-complex manner, and the methods of the competency measurement must be defined clearly.

When developing the number and nature of the courses, consider the following concepts. Using more courses to present the information gives the educator a means to easily identify areas for student remediation. Separate grades for the courses help students recognize areas of strength and weakness. Fewer course offerings help students easily organize their workloads, but the “all the eggs in one basket” philosophy may place undue stress on the student. Including a clinical component in a theory class will require equity when developing outcome measurements rationales, as clinical grades may carry more weight than didactic/theory grades.

Once clusters have been developed, the next step in creating a master curriculum is creating a syllabus for each course or cluster division. The format for syllabus development is similar to that of the program overview but will involve greater detail. A syllabus contains the following areas: course title, course overview, course specific learning objectives, teaching and learning methodologies, a list of required and optional texts, and methods to measure or evaluate outcomes.

The course title section should include a short, but descriptive course name. Institutions may also assign a course number. This section lists the hours assigned for the course and the credits awarded for successful completion. If known, the instructor’s name and credential are included. The course overview is a brief summary of the learning focus and activity during the course. The overview gives the student information about course offerings. It is written in narrative form and is commonly used both in the syllabus and as the course description in the program overview section.

The learning objectives present a summary of the skills and information learned during the course. The objectives, like the program objectives, must address the cognitive, psychomotor and affective skills related to the selected course, and must include the condition, the performance and the standard. The objectives are written using action verbs and must be measurable.

Teaching methodologies are listed and may include the following: lecture, demonstration/return demonstration, written or reading assignments, journal article review or research, oral presentations, audiovisual aids, computer-assisted instruction, activity packages and externships or internships. Teaching methodologies should address the needs of the auditory, visual and kinesthetic learner.

The syllabus should provide a comprehensive list of reading materials and equipment required for the course. The list should include the author, title, edition, publisher, and ISBN number for required texts. The manufacturer’s name and the style number of specific equipment and supplies should also be listed.

A list of topics presented during the course should then be completed. This list will later be more formally developed into lesson plans. The instructor may choose to include the following information: the dates or number of classes, reading assignments, laboratory assignments, or other outside assignments, and the outcome assessment tool used to determine successful completion.

The topic listing helps the student understand the focus and assists them in learning the objectives of the course.

The last component of the syllabus is outcome measurement. This describes the types of activities that contribute to the formulation of the student's grade. This section gives the student knowledge of how his/her grade will be determined, as well as the weight of each grade or activity. With this information, students can monitor their progress throughout the course.

### **Developing Lesson Plans**

Once the syllabus for each course in the program is completed, the developer should focus his or her energies and talents toward lesson plan development. A lesson plan details the activities that will be undertaken by the student and/or instructor to assist the learner in knowledge and skills attainment. These areas of information are included in the lesson plan:

1. Unit of study
2. Instructional objectives
3. Content
4. Instructional procedures (activities)
5. Evaluation (assessment) tools
6. Resources

A lesson plan should be documented in such a detail that any person with knowledge of the educational process and the field of study should be able to follow the plan and present the material.

This plan becomes invaluable for team teaching, substitute teachers, and for documentation – especially during programmatic or institutional validation and accreditation. Lesson plans also assist in scheduling outside resources, such as audiovisual equipment, guest lecturers and laboratory time.

Developing a master curriculum is a process that creates educational experiences to meet the intentions of the curriculum planner and the needs of the learner. Developing a master curriculum identifies purpose, sets goals and behavioral objectives, aligns curriculum content and focuses on the primary needs of the learners.

### **Writing Behavioral Objectives**

Behavioral objectives, learning objectives, instructional objectives, and performance objectives are synonymous terms that refer to a description of observable student

behavior or performance. Behavioral objectives are statements that describe what learners are doing while they are learning. An educational behavioral objective is a clear and unambiguous description of a planned educational expectation(s) for the learner that specifies what behavior a student must perform or demonstrate in order for a teacher to infer that learning took place. Teachers need to describe the desired behaviors to avoid misinterpretation by students and colleagues. A properly worded objective lets students know what is expected of them. Equally important, it allows the instructor to measure the effectiveness of their work. Without behavioral objectives, it is difficult to determine exactly what the outcomes of a particular learning experience are supposed to achieve.

The following table summarizes the different levels of behavioral objectives.

**TABLE 1 – COMPARISON OF LEVELS I, II AND III  
BEHAVIORAL OBJECTIVES**

<b>Level</b>	<b>I</b>	<b>II</b>	<b>III</b>
<b>Describe</b>	<b>BROAD STATEMENTS</b>	Still general statements, but more detailed than Level I	Specific, behaviorally stated objectives
<b>Form</b>	Formed at the school district or school board level	Formed at school or department level	Formed by teams in the same department or by a single instructor
<b>Accomplish</b>	Rarely revised	Outline of process to accomplish the objective	Describe expected student outcome, method of assessing outcome and level of performance – often revised

When writing behavioral objectives, a particular content or informational group should be defined. Behaviorally stated objectives contain three essential elements:

1. The action to be observed and measured must be given a name to indicate that learning has occurred.
2. The conditions under which the behavior and learning is expected to occur should be described.
3. The criteria for acceptable performance should be specifically described.

Wiles and Bondi described development of the A, B, C, D method. “A” is for audience, “B” is for behavior, “C” is for condition, and “D” is for degree of completion. A behavioral objective that contains all of these components will be a complete objective that has the potential of being well written. The following is an example:

- A. The student will (audience)
- B. successfully complete the surgical scrub (behavior)
- C. during lab period on day 10 of the second semester (condition)
- D. scoring 100% (degree)

The instruction that leads to the behavior is not ever included in the actual objective. The condition of performance should concentrate only on describing the conditions under which the desired learned behavior is to be performed.

Critics of the above method believe it is simplistic and causes the objectives to be focused on training and not education. However, instructors just beginning in the learning process of writing behavioral objectives are actually writing objectives focused on the lower levels of cognitive behavior. As experience is gained, instructors can master the skill of writing behavioral objectives leading to psychomotor and affective learning.

### **Reference**

Wiles J, Bondi J. *Curriculum Development a Guide to Practice*. 8<sup>th</sup> ed. Upper Saddle River, New Jersey: Prentice-Hall; 2010.

### **Developing a Lesson Plan**

The basic components of a lesson plan include the following:

1. Unit of study: Section(s) of a larger plan (syllabus) to be addressed by the lesson.
2. Instructional objectives: State the purpose of the lesson and the specific behaviors that the learner will be able to demonstrate at the conclusion of the learning experience. (Refer to Writing Behavioral Objectives.)
3. Content: The content identifies the information to be learned. The content will be specific, detailed and will contain all the components of the educational experience.
4. Instructional activities: List the planned activities to facilitate learning.
5. Evaluation tools: The assessment tools describe the method(s) used to assess knowledge or skills attainment. It describes what the instructor should be aware of in terms of student behaviors.
6. Resources: The resources are a list of materials and teaching aids that will be utilized during the educational process. These “tools” may include reading assignments, audio-visual aids, computer-assisted instructional material, and other supplemental materials.

### Lesson plan – Outline

1. Unit of study: \_\_\_\_\_
2. Instructional objectives: \_\_\_\_\_  
\_\_\_\_\_
3. Content: \_\_\_\_\_  
\_\_\_\_\_
4. Instructional procedures (activities): \_\_\_\_\_  
\_\_\_\_\_
5. Evaluation (assessment) tools: \_\_\_\_\_  
\_\_\_\_\_
6. Resources: \_\_\_\_\_  
\_\_\_\_\_

### Lesson plan – sample

- I. Unit of study
  - A. #3 in syllabus: Instrumentation
- II. Instructional Objectives
  - A. Identify the structure, classifications, names, materials, finishes and uses of basic surgical instrumentation.
  - B. Understand the relationship between instrument type and usage.
  - C. Apply knowledge of basic surgical instrumentation to specific surgical procedures.
  - D. Apply knowledge of disinfecting and sterilizing instruments.
- III. Instructional Activities
  - A. Reading assignment
    1. *Surgical Technology for the Surgical Technologist: A Positive Care Approach*, Chapter 7, pp. 156 – 184.
    2. *Surgical Technology for the Surgical Technologist: A Positive Care Approach*, Chapter 10, pp. 254 – 263.
  - B. Written assignment
    1. *Study Guide to Accompany Surgical Technology for the Surgical Technologist: A Positive Care Approach*, Chapter 7.
    2. *Study Guide to Accompany Surgical Technology for the Surgical Technologist: A Positive Care Approach*, Chapter 10.

- C. Computer Lab
  - 1. Watch “Instrument Cycle” portion of *AST Asepsis & Sterile Technique* DVD.
- D. Classroom Lecture
  - 1. PowerPoint presentation supplemented with lecture notes
  - 2. Video presentation: Instrumentation section of *AST Basic Surgical Instrumentation, Equipment & Supplies* DVD
- E. Lab
  - 1. Instrument anatomy
  - 2. Instrument classification
  - 3. Instrument names
  - 4. Passing techniques
- F. Field trip
  - 1. Sterile Processing Department
    - (a) Decontamination area
    - (b) Reprocessing area
    - (c) Sterilization area
- G. Assessment
  - 1. Quiz based on textbook reading assignments
  - 2. Completion of written assignments
  - 3. End-of-unit written exam
  - 4. Lab return demonstrations
- H. Resources
  - 1. *Surgical Technology for the Surgical Technologist: A Positive Care Approach*
    - (a) Textbook
    - (b) Study guide
  - 2. AST DVD *Asepsis & Sterile Technique*
  - 3. PowerPoint lecture and supplementary notes
  - 4. AST DVD *Basic Surgical Instrumentation, Equipment & Supplies*
  - 5. Minor and major instrument sets in lab
  - 6. *Instrumentation for the Operating Room a Photographic Manual*

**Content:**

- I. Instruments
  - A. Structure
    - 1. Ringed instruments
      - a. Tips
        - (1) Blunt
        - (2) Pointed
        - (3) Non-toothed
        - (4) Multitoothed
      - b. Jaws
        - (1) Curved
        - (2) Straight

- (3) Angled
    - (4) Traumatic (crushing)
    - (5) Atraumatic (non-crushing)
    - (6) Serrations
      - (a) Horizontal
      - (b) Longitudinal
      - (c) Combined
  - c. Box lock
  - d. Box lock pin
  - e. Shanks
  - f. Ratchets
  - g. Finger rings
- 2. Scissors
  - a. Tips
    - (1) Blunt
    - (2) Pointed
  - b. Blades
    - (1) Curved
    - (2) Straight
    - (3) Angled
    - (4) Sharp
    - (5) Serrated
  - c. Joint
  - d. Shank
  - e. Finger rings
- 3. Tissue forceps
  - a. Tips
    - (1) Non-toothed
    - (2) Toothed
      - (a) Single toothed
      - (b) Multitoothed
      - (c) Circular teeth
  - b. Jaws
    - (1) Smooth serrated
    - (2) DeBakey style
  - c. Shanks
  - d. Grasping area
  - e. Spring joint
- 4. Retractors
  - a. Blade
    - (1) Straight
    - (2) Curved
    - (3) Angled
    - (4) Specialty
  - b. Prongs
    - (1) Blunt

- (2) Sharp
  - c. Shank
  - d. Handle
    - (1) Loop grip
    - (2) Hollow grip
  - e. Self-retaining
- B. Classifications
  - 1. Cutting
    - a. Scalpels
    - b. Scissors
    - c. Bone
      - (1) Power
    - d. Specialty
  - 2. Grasping and holding
    - a. Tissue forceps
    - b. Allis
    - c. Lahey traction forceps
    - d. Kocher (Ochsner)
    - e. Lane
  - 3. Clamping and occluding
  - 4. Retracting and viewing
  - 5. Probing and dilating
  - 6. Suturing
  - 7. Suctioning
    - a. Frazier
    - b. Yankauer
    - c. Poole
  - 8. Accessory
    - a. Backhaus perforating towel clamp
    - b. Lorna nonperforating towel clamp
    - c. Foerster sponge forceps
    - d. Ruler
- C. Materials
  - 1. Stainless steel
  - 2. Titanium
  - 3. Alloys
- D. Finishes
  - 1. Polished (mirror)
  - 2. Satin (dull)
  - 3. Ebonized
- E. Instrument sets
  - 1. Minor
  - 2. Major
  - 3. Specialty



- F. Care and handling
  - 1. Preoperative
    - a. Gathering for specific procedure
    - b. Opening
      - (1) Container system
      - (2) Wrapped
    - c. Retrieving from the container
    - d. Organizing within the sterile field
      - (1) Back table
      - (2) Mayo stand
    - e. Counting
  - 2. Intraoperative
    - a. Anticipation
    - b. Signals
      - (1) Verbal request
      - (2) Hand signal
    - c. Passing techniques
    - d. Safety precautions
  - 3. Postoperative
    - a. Cleaning and decontamination
    - b. Inspection and maintenance
    - c. Reassembly of the set
    - d. Preparation for sterilization
    - e. Sterilization
    - f. Storage

## APPENDIX D

### RESOURCES

#### Printed Resources

Association of Surgical Technologists. *Patient Skin Prep Charts for the Surgical Technologist*. Littleton, CO: Author; 2010.

Association of Surgical Technologists. *Surgical Technologist Certifying Exam Study Guide*. 3<sup>rd</sup> ed. Littleton, CO: Author; 2011.

Ball, K. *Endoscopic Surgery*. St. Louis, MO: Mosby; 1997.

Beckett, B. *Identifying Surgical Instruments*. 3<sup>rd</sup> ed. Thousand Oaks, CA: Author; 1998.

Bogue, EG. *Leadership By Design Strengthening Integrity in Higher Education*. Hoboken, NJ: Jossey-Bass; 1994.

Boice, R. *First-Order Principles For College Teachers*. Hoboken, NJ: Anker; 1996.

Burden N, Quinn, DMD, O'Brien D, Dawes BS. *Ambulatory Surgical Nursing*. 2<sup>nd</sup> ed. Philadelphia, PA: WB Saunders; 2000.

Canale ST. *Campbell's Operative Orthopaedics*. 10<sup>th</sup> ed. St. Louis, MO: Mosby; 2002.

Crigger BJ. *Cases in Bioethics: Selections from the Hastings Center Report*. 3<sup>rd</sup> ed. New York, NY: St. Martin's Press; 1998.

Damjanov I. *Pathology for the Health Professions*. 3<sup>rd</sup> ed. Philadelphia, PA: WB Saunders; 2005.

Davis MS. *Advanced Precautions for Today's OR, The Operating Room Professional's Handbook for the Prevention of Sharps Injuries and Bloodborne Exposures*. Atlanta, GA: Sweinbinder; 1999.

Edge RS, Groves JR. *Ethics of Health Care: A Guide for Clinical Practice*. 3<sup>rd</sup> ed. Clifton Park, NY: Delmar Cengage Learning; 2005.

Ethicon. *Wound Closure Manual*. Somerville, NJ: Author; 2007.

Feix J. *Pharmacology Handbook for Surgical Technologists*. Clifton Park, NY: Delmar Cengage Learning; 2005.

Frey KB, Price P. *Surgical Anatomy and Physiology for the Surgical Technologist*. Clifton Park, NY: Thomson Delmar Learning; 2006.

Frey, KB, Ross T, eds. *Surgical Technology for the Surgical Technologist: A Positive Care Approach*. 3<sup>rd</sup> ed. Clifton Park, NY: Delmar Cengage Learning; 2008.

Goldman MA. *Pocket Guide to the Operating Room*. 2<sup>nd</sup> ed. Philadelphia, PA: FA Davis; 1996.

Jackson JA. *Ethics, Legal Issues and Professionalism in Surgical Technology*. Clifton Park, NY: Delmar Cengage Learning; 2006.

Leebov W, Olson L, Scott G. *Achieving Impressive Customer Service, 7 Strategies for the Health Care Manager*. Hoboken, NJ: Jossey-Bass; 2000.

MacVittie B. *Vascular Surgery*. St. Louis, MO: Mosby; 1998.

Mangonon PC, McKenney MG, Moylan JA, eds. *Understanding Surgical Disease*. Philadelphia, PA: Lippincott Williams & Wilkins; 1998.

Marieb EN. *Essentials of Human Anatomy and Physiology*. 9th ed. San Francisco, CA: Benjamin Cummings; 2008.

Moore KL, Dalley AF, Agur, AMR. *Clinically Oriented Anatomy*. 6<sup>th</sup> ed. Philadelphia, PA: Lippincott Williams & Wilkins; 1999.

Nagle GM. *Genitourinary Surgery*. St. Louis, MO: Mosby; 1997.

Nilson LB. *Teaching At Its Best: A Research-Based Resource for College Instructors*. 3<sup>rd</sup> ed. Hoboken, NJ: Jossey-Bass; 1998.

Nora PF. *Operative Surgery; Principles and Techniques*. 3<sup>rd</sup> ed. Philadelphia, PA: WB Saunders; 1990.

Olson T. *A.D.A.M. Student Atlas of Anatomy*. 2<sup>nd</sup> ed. New York, NY: Cambridge University Press; 2008.

Pieknik R. *Suture and Surgical Hemostasis: A Pocket Guide*. Philadelphia, PA: WB Saunders; 2006.

Phillips N. *Berry & Kohn's Operating Room Technique*. 11<sup>th</sup> ed. St. Louis, MO: Mosby; 2007.

Phippen ML, Papanier-Wells M. *Patient Care During Operative and Invasive Procedures*. Philadelphia, PA: WB Saunders; 2000.

Price P, Frey KB. *Microbiology for Surgical Technologists*. Clifton Park, NY: Delmar Learning; 2003.

Rhode SJ, Ginsberg SP, eds. *Ophthalmic Technology: A Guide for the Eye Care Assistant*. New York, NY: Raven Press; 1988.

Rothrock JC. *Alexander's Care of the Patient in Surgery*. 14<sup>th</sup> ed. St. Louis, MO: Mosby; 2010.

Scanlon VC, Sanders T. *Understanding Human Structure and Function*. Philadelphia, PA: FA Davis; 1997.

Shi L, Singh D. *Delivering Health Care In America: A Systems Approach*. 4<sup>th</sup> ed. Sudbury, MA: Jones and Bartlett Learning; 2007.

Siemionow MZ, Eisenmann-Klein M, eds. *Plastic and Reconstructive Surgery*. New York, NY: Springer; 2010.

Silverthorn DU, Ober WC, Garrison CW, Silverthorn AC. *Human Physiology: An Integrated Approach*. 2<sup>nd</sup> ed. Old Tappan, NJ: Benjamin-Cummings; 2000.

Skandalakis J, Skandalakis P, Skandalakis L. *Surgical Anatomy and Techniques: A Pocket Manual*. 3<sup>rd</sup> ed. New York, NY: Springer-Verlag; 2008.

Snyder K, Keegan C. *Pharmacology for the Surgical Technologist*. 2<sup>nd</sup> ed. Philadelphia, PA: WB Saunders; 2006.

Tighe, SM. *Instrumentation For The Operating Room A Photographic Manual*. 7th ed. St. Louis, MO: Mosby; 2007.

Tortora G, Derrickson BH. *Principles of Anatomy and Physiology*. 12<sup>th</sup> ed. Hoboken, NJ: Wiley; 2008.

Townsend C, Beauchamp R, Evers BM, Mattox KL. *Sabiston Textbook of Surgery: The Biological Basis of Modern Surgical Practice*. 18<sup>th</sup> ed. Philadelphia, PA:WB Saunders; 2007.

Venes D, ed. *Taber's Cyclopedic Medical Dictionary*. 21<sup>st</sup> ed. Philadelphia, PA: FA Davis; 2009.

Walsh PC, Retik AB, Vaughan ED, Wein AJ, Kavoussi LR, Novick AC, et al. *Campbell's Urology*. 8<sup>th</sup> ed. Philadelphia, PA: WB Saunders; 2002.

Weimer M. *Inspired College Teaching: A Career-Long Resource for Professional Growth*. Hoboken, NJ: Jossey-Bass; 2010.

Wightman M, Lin DM. *Sedation, Anesthesia, and JCAHO*. 3<sup>rd</sup> ed. Marblehead, MA: HCPro, Inc.; 2005.

**REVISED 2014 CORE CURRICULUM FOR SURGICAL TECHNOLOGY, 6<sup>th</sup> edition**  
**SURGICAL ROTATION CASE REQUIREMENTS**

**Goal Statement:** The goal of the Surgical Rotation Case Requirements is to contribute to the development of a well-rounded, competent, entry-level surgical technologist. As stated in CAAHEP Standard II. Program Goals, C. Minimum Expectations:

“To prepare competent entry-level surgical technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains.”

**Objectives:**

- I.** The surgical technology program is required to verify through the surgical rotation documentation the students’ progression in the scrub role in surgical procedures of increased complexity as he/she moves towards entry-level graduate competency.
  - A.** While it is understood that no program is able to control surgical case volume or the availability of various surgical specialties, it is the responsibility of the program to provide students with a diversified surgical rotation experience.
  - B.** No information in this document prevents programs from exceeding the minimum established by the Surgical Rotation Case Requirements.
  
- II.** Students must complete a minimum of 120 cases as delineated below.
  - A.** General Surgery cases
    - 1.** Students must complete a minimum of 30 cases in General Surgery; 20 which must be performed in the First Scrub Role. The remaining 10 cases may be performed in either the First or Second Scrub Role.
  - B.** Specialty cases
    - 1.** Students must complete a minimum of 90 cases in various surgical specialties, excluding General Surgery; 60 which must be performed in the First Scrub Role. The additional 30 cases may be performed in either the First or Second Scrub Role.
      - a.** A minimum of 60 surgical specialty cases must be performed in the First Scrub Role and distributed amongst a **minimum** of **four** surgical specialties.
        - (1)** A minimum of 10 cases in the First Scrub Role must be completed in each of the required minimum of **four** surgical specialties (40 cases total required).
        - (2)** The additional 20 cases in the First Scrub Role may be distributed amongst any one surgical specialty or multiple surgical specialties.
      - b.** The remaining 30 surgical specialty cases may be performed in any surgical specialty either in the First or Second Scrub Role.

**C. Optional surgical specialties**

1. Diagnostic endoscopy cases and vaginal delivery cases are **not** mandatory. However, up to 10 diagnostic endoscopic cases and 5 vaginal delivery cases can be counted toward the maximum number of Second Scrub Role cases.

- a. Diagnostic endoscopy cases **must** be documented in the category of “Diagnostic Endoscopy”, rather than by specialty.

- b. Vaginal delivery cases **must** be documented in the category of “Labor & Delivery” rather than in the OB/GYN specialty.

**D. Case experience in the Second Scrub Role is **not** mandatory.**

**E. Observation cases **must** be **documented**, but do not count towards the 120 required cases.**

**F. Counting cases**

1. Cases will be counted and documented according to surgical specialty (exception being diagnostic endoscopic cases; refer to II. C.1.a. above).

2. Examples of counting cases

- a. Trauma patient requires a splenectomy and repair of a Lefort I fracture.

Two cases can be counted and documented since the splenectomy is general surgery specialty and repair of LeFort I is oral-maxillofacial surgical specialty.

- b. Patient requires a breast biopsy followed by mastectomy. It is one pathology, breast cancer, and the specialty is general surgery; therefore, it is counted and documented as one procedure – one case.

- c. Endoscopic cases that convert to an open case (e.g.: Laparoscopic Cholecystectomy converted to an Open Cholecystectomy) are counted and documented as one (1) procedure—one case.

<b>Surgical Category</b>	<b>Total # of Cases Required</b>	<b>Minimum # of First Scrub Cases Required</b>	<b>Additional first or second scrub role cases that can be applied towards minimum of 120</b>
General Surgery	30	20	10
Surgical Specialties: <ul style="list-style-type: none"> <li>• Cardiothoracic</li> <li>• ENT</li> <li>• Eye</li> <li>• GU</li> <li>• Neuro</li> <li>• Ob-Gyn</li> <li>• Oral/Maxillofacial</li> <li>• Orthopedics</li> <li>• Peripheral vascular</li> <li>• Plastics</li> </ul>	90	60	30
Optional: Diagnostic Endoscopy: <ul style="list-style-type: none"> <li>• Bronchoscopy</li> <li>• Colonoscopy</li> <li>• Cystoscopy</li> <li>• EGD</li> <li>• ERCP</li> <li>• Esophagoscopy</li> <li>• Laryngoscopy</li> <li>• Panendoscopy</li> <li>• Ureteroscopy</li> </ul>			10 diagnostic endoscopy cases may be applied <b>only</b> toward the Second Scrub Role cases. <ul style="list-style-type: none"> <li>• Refer to Objective II. C.</li> </ul>
Optional: Labor & Delivery			5 vaginal delivery cases may be applied <b>only</b> toward the Second Scrub Role cases. <ul style="list-style-type: none"> <li>• Refer to Objective II. C.</li> </ul>
<b>Totals</b>	<b>120</b>	<b>80</b>	<b>40</b>



## **FIRST AND SECOND SCRUB ROLE AND OBSERVATION**

### **FIRST SCRUB ROLE**

The student surgical technologist shall perform the following duties during any given surgical procedure with proficiency. The following list is provided to identify the items that must be completed in order to document a case in the First Scrub Role. A student not meeting the five criteria below cannot count the case in the First Scrub Role and the case must be documented in the Second Scrub Role or Observation Role.

- Verify supplies and equipment needed for the surgical procedure.
- Set up the sterile field with instruments, supplies, equipment, medication(s) and solutions needed for the procedure.
- Perform counts with the circulator prior to the procedure and before the incision is closed.
- Pass instruments and supplies to the sterile surgical team members during the procedure.
- Maintain sterile technique as measured by recognized breaks in technique and demonstrate knowledge of how to correct with appropriate technique.

### **SECOND SCRUB ROLE**

The Second Scrub Role is defined as the student who is at the sterile field who has not met all criteria for the First Scrub Role, but actively participates in the surgical procedure by performing one or more of the following:

- Sponging
- Suctioning
- Cutting suture
- Holding retractors
- Manipulating endoscopic camera

### **OBSERVATION ROLE**

The Observation Role is defined as the student who is in the operating room performing roles that do not meet the criteria for the First or Second Scrub Role. These observation cases are not to be included in the required case count, but must be documented by the program.