



**EMT - BASIC
ADVANCED AIRWAY
MANAGEMENT
PROGRAM - PEAD
LESSON PLANS**

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EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

OBJECTIVES

- Describe the anatomy and function the upper and lower airways.
- Describe respiratory volumes and capacities in relationship to the need for assisted ventilations.
- Identify the specific observations and physical findings to be evaluated in patients with respiratory complaints.
- Identify specific observations and physical findings commonly found in patients presenting in respiratory and/or cardiac arrest.
- Identify the basic principles of airway management.
- Describe the indications for suctioning.
- Identify rigid and flexible suction catheters and the indications for their use.
- Identify indications and contraindications for the use of pharyngeal/esophageal airway (PEA) devices.
- Identify the advantages and disadvantages of using pharyngeal/esophageal airway devices.
- Identify those situations in which pharyngeal/esophageal airway devices may be removed.
- Demonstrate placement of pharyngeal/esophageal airway devices.
- Demonstrate the method of assuring and maintaining correct placement of pharyngeal/esophageal airway devices.
- Demonstrate re-ventilation for missed placement of pharyngeal/esophageal airway devices.

- Demonstrate on a manikin the proper technique for the use and maintenance of the following airway adjuncts:
 - nasal cannula
 - non-rebreather mask
 - bag valve mask

- Demonstrate sterile suctioning techniques on a manikin with a pharyngeal/esophageal tube in place.

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

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OUTLINE

- A. Anatomy and Physiology of the Respiratory System
 - 1. Upper Airway
 - 2. Lower Airway
 - 3. Lungs
 - 4. Respiratory Physiology

- B. Respiratory Rates, Volumes and Capacities
 - 1. Normal Values
 - 2. Abnormal Values
 - 3. Assisted Ventilation

- C. Oxygen and Carbon Dioxide Measurements
 - 1. Oxygen Saturation
 - a. Normal values
 - b. Abnormal values and their significance
 - 2. Measurement by the EMT-BASIC
 - a. Oxygen (PaO₂) Pulseoxymetry
 - b. Carbon Dioxide (PaO₂) Color-metric Devices (End tidal CO₂)

- D. Respiratory Complaint Presentations
 - 1. General Assessment
 - 2. Specific Presentations (chronic obstructive pulmonary disease, asthma, pneumonia, left heart failure, trauma, pulmonary embolus, etc.)
 - a. History
 - b. Observations
 - c. Physical Findings
 - d. Protocol Introduction

- E. Respiratory/Cardiac Arrest
 - 1. Observations/Physical Findings
 - 2. Protocol Introduction

- F. Principles of Airway Management
 - 1. Manual Techniques

2. Adjuncts
3. Ventilation
4. Oxygenation

G. Suctioning

1. Indications
2. Contraindications
3. Equipment
4. Techniques

H. Pharyngeal/Esophageal Airway Devices

1. Indications
2. Contraindications
3. Advantages
4. Disadvantages
5. Equipment
 - a. Combitube (any dual-lumen airway)
6. Use with Bag Valve Mask
7. Placement Techniques
8. Removal

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

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LECTURE PLAN

LESSON 1

LESSON TITLE

Respiratory anatomy and Physiology (allow approximately 15 minutes)

LESSON OBJECTIVE

At the completion of this lesson, the student will be able to:

- Describe the anatomy and function of the upper and lower airways.

TEXT AND REFERENCES

- *Emergency Care and transportation of the Sick and Injured*, AAOS 8th Edition, Chapter 38, Advanced Airway Management, Pages 883-886
- *Combitube Training Program, Student Study Guide, 2nd Edition*, Northwest EMS Associates, 1995
- *Emergency Care*, 9th Edition, Brady Publishing, 2001, Pages 788-789

MATERIALS AND EQUIPMENT

- PowerPoint projector
- Anatomy slides
- Handouts of diagrams of airway anatomy
- Handout of terminology

INSTRUCTOR PREPARATION

- Review reading assignment
- Prepare handouts and overheads
- Review lesson outline and plan presentation

MOTIVATION

Give a case scenario which demonstrates the critical important of understanding airway anatomy and proper management of airway compromise.

Note: Have small groups discuss the scenario and provide solutions.

PRESENTATION OUTLINE

- 1) The Upper Airway Application
 - a) General function of Respiratory System
 - i) Remove carbon dioxide from the blood
 - ii) Transfer oxygen into the blood
 - b) Structures
 - i) Nose
 - ii) Nasopharynx
 - iii) Mouth
 - iv) Oropharynx
 - v) Hypopharynx
 - vi) Larynx
 - vii) Epiglottis
 - c) Functions
 - i) Passageway for air
 - ii) Warms
 - iii) Humidifies
 - iv) Filters
 - v) Protection
 - (1) Gag reflex
 - (2) Cough
 - vi) Speech
- 2) The Lower Airway
 - a) Structure
 - i) Trachea
 - ii) Main stem bronchi
 - iii) Secondary bronchi
 - iv) Bronchiolus
 - v) Alveoli
 - b) Function
 - i) Air passage
 - ii) Gas exchange
 - iii) Warm
 - iv) Humidify
- 3) The Lungs
 - a) Structure
 - i) Location
 - ii) Lobes
 - iii) Pleura
- 4) Blood supply
- 5) Musculoskeletal system
- 6) Mechanics of Respiration/Ventilation
 - a) Definitions
 - i) Respiration
 - ii) Ventilation
 - b) Control of respiration

- i) Brain stem
 - ii) Diaphragm
 - iii) Intercostal muscles
 - iv) Carbon Dioxide's influence
 - v) Voluntary versus involuntary
- 7) Respiratory cycle
- a) Inspiration
 - i) Active phase
 - ii) Muscles contract
 - iii) Chest expands
 - iv) Lowers internal pressure
 - v) Atmospheric pressure forces air to enter
 - vi) Lasts approximately 1-2 seconds
 - b) Expiration
 - i) Passive phase
 - ii) Chest relaxes
 - iii) Pressure increases
 - iv) Air expelled
 - v) Lasts approximately five seconds

SUMMARY

- Stress important of knowledge of respiratory system
- Review key points

ASSESSMENT

- Question and answer session
- Label structures on diagrams
- Have small groups write two test questions over this lesson

ASSIGNMENT

- Reading for next lesson
- Questions in workbook
- Write definitions to key terms used in today's lesson

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

LECTURE PLAN

LESSON 2

LESSON TITLE

- Respiratory Volume and Management (allow approximately 15 minutes)

LESSON OBJECTIVE

At the completion of this lesson, the student will be able to:

- Describe respiratory volumes and capacities in relationship to the need for assisted ventilations.
- Identify the normal pulse oxymetry ranges for PaO₂ and color-metric indications of PaCO₂ levels

TEXT AND REFERENCES

- *Emergency Care and transportation of the Sick and Injured*, AAOS 8th Edition, Chapter 38, Advanced Airway Management, Pages 883-886
- *Combi-tube Training Program, Student Study Guide*, 2nd Edition, Northwest EMS Associates, 1995
- *Emergency Care*, 9th Edition, Brady Publishing, 2001, Pages 788-789

MATERIALS AND EQUIPMENT

- Box of drinking straws
- Manikins
- Bag valve mask devices
- O₂ tanks
- Cannulas
- Non-rebreathing masks
- Overhead projector
- Pulse oximeter
- Color-metric end tidal CO₂ device

INSTRUCTOR PREPARATION

- Review reading assignment
- Plan class activities
- Prepare overheads, handouts

MOTIVATION

Have students breathe through a drinking straw for 30-60 seconds so they sense the feeling of being unable to adequately breathe.

Monitor students closely in case someone has actual breathing problems.

PRESENTATION OUTLINE

- 1) Respiratory rates, volumes and capacities
 - a) Review control of respiration
 - i) Voluntary control versus involuntary
 - ii) Center in brain stem
 - iii) Diaphragm and intercostal muscles
 - b) Respiratory cycle
 - i) Regulation by chemoreceptors
 - c) Location of receptors

- 2) Response to changes in oxygen, carbon dioxide levels.
 - a) High CO₂ increases respiratory activity
 - b) Low CO₂ decreases activity
 - c) Hypoxic drive in COPD patients

- 3) Measures of respiratory function
 - a) Normal respiratory rates
 - i) Adults, 12-20 times per minute
 - ii) Children, approximately 18-24 times per minute
 - iii) Infants, may be 22-36 times per minute
 - iv) Newborns, 40-60 times per minute

- 4) Factors affecting respiratory rate
 - a) Fever - increases
 - b) Anxiety - increases
 - c) Insufficient oxygen - increases
 - d) Depressant drugs - decreases
 - e) Sleep – decreases

- 5) Volumes
 - a) Lung capacity - adult male = 6 liters
 - b) Tidal volume
 - c) Volume
 - i) One breathing cycle
 - ii) About 500 ml of air at rest
 - d) Dead airspace - approximately 150 ml
 - e) Alveolar air approximately 350 ml reach alveoli for gas exchange
 - f) Minute volume (mv)
 - i) Total air moved per minute
 - ii) Rate (x) volume = mv
 - iii) Important assessment item

- 6) Factors affecting minute volume
 - a) Head, neck, chest injury
 - b) Shock states
 - c) Diabetic conditions
 - d) Any condition in which CO₂/O₂ are increasing or decreasing markedly

- 7) Assisting ventilation and oxygenation
 - a) Airway control
 - b) Suctioning
 - c) Patient positioning
 - d) Supplemental oxygen
 - e) Mechanical assistance
 - f) Oxygen and carbon dioxide measurements

- 8) Oxygen
 - a) Measurable with pulse oximeter
 - b) Gives the percent of hemoglobin saturated
 - c) Should be close to 100%, if below 90%, might require intervention with oxygen and ventilation

- 9) Carbon Dioxide
 - a) Measurable with a color-metric device attached to dual-lumen airway
 - b) Confirms correct placement of device
 - c) Color shifts will indicate ventilatory effectiveness

SUMMARY

- Review use of pulseoxymetry and end-tidal CO₂ detectors
- Emphasize the practical side of assessing patients based more on their clinical presentation.

ASSESSMENT

- Have groups develop scenarios with abnormal respirations and that require intervention.
- Have them present scenario to another group. Determine accuracy of decision-making.

ASSIGNMENT

- Reading for next lesson

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LECTURE PLAN

LESSON 3

LESSON TITLE

Assessing Respiratory Problems (allow approximately 1 hour)

LESSON OBJECTIVE

At the completion of this lesson, the student will be able to:

- Identify the specific observations and physical findings in patients with respiratory complaints.

TEXT AND REFERENCES

- *Emergency Care and transportation of the Sick and Injured*, AAOS 8th Edition, Chapter 38, Advanced Airway Management, 2000, Pages 883-886
- *Combitube Training Program*, Student Study Guide, 2nd Edition, Northwest EMS Associates, 1995
- *Emergency Care*, 9th Edition, Brady Publishing, 2001, Pages 788-789

MATERIALS AND EQUIPMENT

- TV/VCR
- Manufacturers Video on use of the selected dual-lumen device
- Overhead projector/slide projector/ or computer and power point presentation
- OHD-EMS *Skills Performance Reference Guide* (2002 edition)
- Audio tape of wheezing, crackles (if not provided with video library)

Suggested Handout: Handouts on signs/symptoms of respiratory distress

INSTRUCTOR PREPARATION

- Preview video
- Prepare handouts, overheads, slides, or computer graphical presentation
- Review reading assignment
- Review lecture outline
- Plan lesson activities

MOTIVATION

Show video and/or presentation

PRESENTATION OUTLINE

- 1) Respiratory Complaint Presentations
 - a) General Assessment
 - i) Primary survey
 - (1) Level of consciousness
 - (2) Adequacy of airway and breathing
 - (3) Speech pattern
 - (4) Obvious respiratory noises
 - (5) Adequacy of circulation
 - ii) Secondary survey
 - (1) SAMPLE history
 - (2) Chief complaint (dyspnea, orthopnea)
 - (3) Chest pain related to breathing (pleuritic)
 - (4) Cough history, and color of sputum
 - (5) Edema
 - (6) Vital signs
 - (7) Patient position
 - b) Inspection, look for:
 - i) Confusion, agitation, orientation
 - ii) Cyanosis
 - iii) Diaphoresis
 - iv) Retractions
 - v) Use of accessory muscles
 - vi) Jugular vein distention
 - vii) Nasal flaring
 - viii) Tracheal tugging
 - c) Palpation
 - i) Skin turgor, color, temperature, diaphoresis
 - ii) Pulse rate, rhythm, quality
 - iii) Chest wall pain, symmetry
 - iv) Tracheal deviation
 - d) Auscultation of lungs
 - i) Are breath sounds clear and equal?
 - ii) Are abnormal sounds present? (Correlate with history if possible)
 - iii) Methods of auscultation
 - iv) Specific respiratory presentations
- 2) Chronic Obstructive Pulmonary Disease (COPD): e.g., emphysema, chronic bronchitis
 - a) Frequently on home oxygen and breathing medications
 - b) Respiratory infections make them decompensate (as may other illnesses)
 - c) Color of sputum may change
 - d) Lungs are typically noisy
 - e) Refer to protocol for oxygen therapy; usually start with low flow oxygen (unless cyanotic)

- 3) Asthma
 - a) Bronchiole constriction, mucous production
 - b) Expiratory wheezing
 - c) History of asthma usually present
 - d) Uses inhaler, breathing medications
 - e) Give humidified oxygen
- 4) Pneumonia
 - a) Fever (not always present in geriatric patients)
 - b) Colored sputum
 - c) Looks ill
 - d) Pediatric and geriatric patients most susceptible
 - e) Give supplemented oxygen
 - f) Position of comfort
 - g) Transport
- 5) Pulmonary Edema (PE/CHF)
 - a) History of heart problems
 - b) History of orthopnea, PND
 - c) Taking heart and water (diuretic) medications
 - d) Noisy in lowest part of lungs
 - e) Give supplemented oxygen
 - f) Position of comfort
 - g) Transport
- 6) Trauma
 - a) Multiple possibilities can occur
 - b) Good basic treatment is best
 - i) Protect the spine
 - ii) Keep airway open
 - iii) Seal open chest wounds
 - iv) Manage flail segments
 - v) Give oxygen and/or assist ventilations
 - vi) Administer I.V. fluids
 - vii) Transport to appropriate medical facility

SUMMARY

- More important to recognize that patient is in respiratory distress than to diagnose the exact reason!
- Ensuring adequate oxygenation and ventilation are never contraindicated.
- The EMT Basic can make a great difference by correctly managing patients in respiratory distress

ASSESSMENT

- Use question and answer technique for review. Give short quiz over material at next session

ASSIGNMENT

- Review respiratory chapters
- Recommend study groups for the quiz

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

LECTURE PLAN

LESSON 4

LESSON TITLE

Assessing respiration/cardiac arrest; basic principles of airway management (allow approximately 1 hour)

LESSON OBJECTIVE

At the completion of this lesson, the student will be able to:

- Identify specific observations and physical findings commonly found in patients presenting in respiratory and/or cardiac arrest.
- Identify the basic principles of airway management.

TEXT AND REFERENCES

- *Emergency Care and transportation of the Sick and Injured*, AAOS 8th Edition, Chapter 38, Advanced Airway Management, 2000, Pages 883-886
- *Combitube Training Program*, Student Study Guide, 2nd Edition, Northwest EMS Associates, 1995
- *Emergency Care*, 9th Edition, Brady Publishing, 2001, Pages 788-789
- *OHD-EMS Skills Performance Reference Guide*, 2002 edition

MATERIALS AND EQUIPMENT

- Overhead projector/laptop/or slide projector
- Airway manikins
- CPR manikins
- Oxygen delivery equipment: cannulas, masks, BVM, resuscitators, O₂ tank
- Nasal and oral airway assortment
- Pharyngeal/Esophageal airway devices, dual-lumen
- Pocket mask

INSTRUCTOR PREPARATION

- Review lecture plans
- Gather equipment
- Plan group activities

MOTIVATION

Have a small group of the class act as first responders on a scenario in which they will find CPR manikin simulating a patient in respiratory arrest. Have them work through the call, and then let them analyze their performance. Use this exercise to emphasize the importance of airway management and some of the technical problems they will encounter and overcome after this lesson.

PRESENTATION OUTLINE

- 1) Respiratory and Cardiac Arrest
 - a) Observations/physical findings
 - i) Quickly unconscious
 - ii) May appear to have seizure initially
 - iii) No air movement at nose or mouth, or agonal respirations
 - iv) Skin color worsens quickly
 - v) No chest movement except if conscious with foreign body in the airway
 - vi) No carotid pulse if in cardiac arrest
 - b) Protocol introduction
 - i) These are the patients on which the EMT-Basic will most likely use the dual lumen airway devices
 - ii) CPR is indicated when pulse is absent
 - iii) The automatic external defibrillator (AED) should be attached as soon as possible if patient is pulseless
 - iv) Continually reassess airway and breathing
 - v) Keep high flow oxygen going as you ventilate the patient
 - vi) Suction as needed
- 2) Principles of Airway Management
 - a) Manual Maneuvers (Demonstrate for the class on a manikin.)
 - b) State advantages and disadvantages.
 - i) Chin lift
 - ii) Jaw lift
 - iii) Jaw thrust
 - iv) Head tilt
 - c) Mechanical
 - i) Nasal airways (nasopharyngeal)
 - (1) Description
 - (2) Advantages
 - (3) Disadvantages
 - (4) Indications
 - (5) Contraindications
 - (6) Methods of insertion
 - ii) Oral airways (oropharyngeal)
 - (1) Description
 - (2) Advantages
 - (3) Disadvantages

- (4) Indications
 - (5) Contraindications
 - (6) Methods of insertion
- 3) Ventilation
- a) Mouth to mask
 - i) Description
 - ii) Advantages
 - iii) Disadvantages
 - iv) Indications
 - v) Contraindications
 - vi) Methods of use
 - b) Bag Valve Mask resuscitator
 - i) Description
 - ii) Advantages
 - iii) Disadvantages
 - iv) Indications
 - v) Contraindications
 - vi) Methods of use
 - c) Evaluation of Effectiveness
 - i) Chest movement
 - ii) Lung sounds
 - iii) Stomach noises/distention
 - iv) Patient response

SUMMARY

- The dual lumen airway device will probably only be used in patients who are not breathing.
- The EMT-Basic has airway adjuncts that, if properly used, can aid tremendously in providing adequate oxygenation and ventilation to emergency patients.

ASSESSMENT

- Give groups other than the original group some scenarios, which require selection and application of airway management techniques and tools. Evaluate the appropriateness of their choice rather than the actual technique at this time.

ASSIGNMENT

- Review notes and be able to give appropriate responses regarding techniques when practicing in the lab.

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

LECTURE PLAN

LESSON 5

LESSON TITLE

Suctioning (allow approximately 15 minutes).

LESSON OBJECTIVE

At the completion of the lesson, the student will be able to:

- Describe the indications for suctioning
- Identify rigid and flexible suction catheters and the indications for their use

TEXT AND REFERENCES

- *Emergency Care and transportation of the Sick and Injured*, AAOS 8th Edition, Chapter 38, Advanced Airway Management, 2000, Pages 883-886
- *Combitube Training Program*, Student Study Guide, 2nd Edition, Northwest EMS Associates, 1995
- *Emergency Care*, 9th Edition, Brady Publishing, 2001, Pages 788-789
- *OHD-EMS Skills Performance Reference Guide*, 2002 edition

MATERIALS AND EQUIPMENT

- Airway manikin
- Portable suction machine
- Assorted suction catheters
- Protective equipment
- Dual lumen airway device of choice

INSTRUCTOR PREPARATION

- Prepare overheads, slides, or graphical presentation
- Review materials
- Assemble equipment
- Review reading assignment

MOTIVATION

Stress importance of suctioning by giving a case scenario, which involves a patient developing an aspiration pneumonia that could have been prevented.

PRESENTATION OUTLINE

- 1) Indications for suctioning
 - a) Vomitus
 - i) Contents
 - (1) Partially digested food
 - (2) Protein dissolving enzymes
 - (3) Stomach acid (hydrochloric)
 - ii) Results
 - (1) Damages alveoli
 - (2) Increases interstitial fluid
 - (3) Barrier between alveoli and capillaries
 - (4) May obstruct airways at any level
 - (5) Severe pneumonia
 - b) Saliva
 - i) Contents (digestive enzymes, bacteria)
 - ii) Results
 - (1) Fill alveolus
 - (2) Interferes with ventilation
 - (3) Pneumonia
 - c) Food similar to vomitus but without the acid
 - d) Blood
 - i) Contents
 - (1) Protein
 - (2) Fibrin
 - (3) Water
 - (4) Electrolytes
 - ii) Results
 - (1) Clogs small airways
 - (2) Creates a chemical reaction
- 2) Suction catheters
 - a) Rigid
 - i) Advantages
 - ii) Disadvantages
 - iii) Indications
 - iv) Contraindications
 - v) Methods of use
 - b) Flexible
 - i) Advantages
 - ii) Disadvantages
 - iii) Indications
 - iv) Contraindications
 - v) Methods of use

SUMMARY

- Reiterate how critical it is to prevent aspiration if at all possible
- Demonstrate positioning and suctioning an unconscious patient and illustrate what might happen if they are left on their back unattended

ASSESSMENT

- Use lab practice time to evaluate application of this lesson

ASSIGNMENT

- Read textbook pages on the use of the pharyngeal/esophageal airway devices

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Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

LECTURE PLAN

LESSON 6

LESSON TITLE

Dual-Lumen Airway Devices (allow approximately 45 minutes)

LESSON OBJECTIVE

At the completion of this lesson, the student will be able to:

- Identify indications and contraindications for the use of the dual lumen airway device.
- Identify the advantage and disadvantages of using the dual lumen airway device.
- Identify those situations in which the dual lumen airway device may be removed.

TEXT AND REFERENCES

- *Emergency Care and transportation of the Sick and Injured*, AAOS 8th Edition, Chapter 38, Advanced Airway Management, 2000, Pages 883-886
- *Combitube™ Training Program*, Student Study Guide, 2nd Edition, Northwest EMS Associates, 1995
- *Emergency Care*, 9th Edition, Brady Publishing, 2001, Pages 788-789
- *OHD-EMS Skills Performance Reference Guide*, 2002 edition

MATERIALS AND EQUIPMENT

- Overhead projector, slide projector, or computer graphical presentation
- Video player
- Training video on dual lumen airway devices
- Airway manikin
- Dual lumen airway devices
- Bag Valve Resuscitator
- Manufacturer's video demonstration of proper use of selected device

INSTRUCTOR PREPARATION

- Review reading assignment and lesson plan
- Prepare overheads and handouts
- Review videotapes

- Practice using airways on the manikin
- Know what other local EMS agencies are using as airway devices with special emphasis on those agencies that have EMT-Basics also using a dual lumen airway device and agencies with EMT-Intermediates who are using the dual lumen airway device.

MOTIVATION

Show a video that demonstrates the use of the dual lumen airway devices

PRESENTATION OUTLINE

- 1) Dual Lumen Airway Devices
 - a) Description of devices
 - i) Pharyngeal tracheal lumen airway (PTLA)
 - ii) Combitube© (remember that there is also a small adult size)
 - b) Indications for use
 - i) Respiratory arrest
 - ii) Cardiac arrest
 - iii) Unconscious, without a gag reflex
 - c) Contraindications
 - i) Gag reflex
 - ii) Conscious
 - iii) Breathing adequately
 - iv) Caustic ingestions
 - v) Known esophageal disease or varices
 - vi) Under 16 years of age
 - vii) Under 5 feet or over 6 feet 8 inches
 - d) Advantages
 - i) Rapid insertion
 - ii) Limits regurgitation, aspiration and stomach distention
 - iii) "Blind" insertion
 - iv) Permits delivery of high O₂ concentration
 - v) Requires less training than endotracheal intubation
 - vi) Can be inserted with neck in neutral position
 - e) Disadvantages
 - i) Patient must be unresponsive without a gag reflex
 - ii) Some models are difficult to obtain a seal with
 - iii) Some models do not totally protect against aspiration
 - iv) Most responsive patients will vomit when airway is removed
 - v) May damage the esophagus
 - f) Method of insertion and removal (show manufacturer's training video)

SUMMARY

- Studies have shown that these airways do work, if used properly
- The EMT-Basic should master the use of these airways; simple familiarity is not enough

ASSESSMENT

- Question and answer session

ASSIGNMENT

- Written and practical examination

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

TERMINOLOGY HANDOUTS

A

Airway devices

- Nasopharyngeal airway
- Non-rebreathing mask
- Oropharyngeal airway
- Pharyngeal-esophageal Airway Device

Aspiration

Auscultation

C

Coughing

Cyanosis

D

Dyspnea

E

Endotracheal intubation

Epiglottitis

End-tidal CO₂ detector

F

Finger sweep

Flow meter

G

Glottis

H

Head tilt/chin tilt

Hypopharynx

Hypoxemia

Hypoxia

I

Inspection

J

Jaw thrust

L

Larynx

M

Minute volume

N

Nasal cannula

Nasopharynx

O

Oropharynx

Oxygen

P

Palpation

Partial rebreathing mask

Pharyngeal-esophageal

Pharynx

Pocket mask

Positive-pressure ventilation

R

Retractions

Respirations

S

Simple face-mask
Soft palate
Stridor
Subcutaneous emphysema
Suction

Suction catheter

T

Tachypnea
Tonsil-tip suction catheter

Abbreviations

CHF	congestive heart failure
CO ₂	carbon dioxide
COPD	chronic obstructive pulmonary disease
ml	milliliter
mmHg	millimeters of mercury
O ₂	Oxygen
PaO ₂	partial pressure of oxygen in arterial blood
PaCO ₂	partial pressure of carbon dioxide in arterial blood
pH	hydrogen-ion concentration - acid / alkaline
PND	paroxysmal nocturnal dyspnea

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic **Pharyngeal Esophageal Airway Device (PEAD)**

INDICATIONS HANDOUTS

Patient is unconscious and unable to protect own airway; no apparent gag reflex.

Contraindications

1. Patients under 70 lbs. and under 5 feet tall.
2. Responsive patients with an intact gag reflex.
3. Patients with known esophageal disease.
4. Patients who have ingested caustic substances.
5. Known or suspected foreign body obstruction of the larynx or trachea.
6. Presence of tracheostomy

Procedure - Prehospital

Cardiorespiratory/Respiratory (Pulse Present) Arrest

- a. The first priority is to defibrillate the patient in cases of ventricular fibrillation. The AED should be applied first, using conventional airway management, following the AED protocol.
- b. The Combitube should be placed during the one minute of CPR between sets of AED analyses. (This may somewhat delay subsequent AED analysis).
- c. Hyperventilate the patient prior to Combitube insertion for 10-15 seconds using either a BVM or Mouth-to-Mask device with supplemental oxygen.
- d. Insertion -- done quickly between ventilation
 - i. Except in cases of suspected cervical spine injury, hyper-extend the head and neck.
 - ii. In cases of suspected cervical spine injury, c-spine precautions will be taken at all times.
 - iii. Patent airway and ventilation should already have been established by other basic methods.
 - iv. In the supine patient, insert the thumb of a gloved hand into the patient's mouth, grasping the tongue and lower jaw between the thumb and index finger, and lift upward.

Caution: When facial trauma has resulted in sharp, broken teeth or dentures, remove denture and exercise extreme caution when passing the Combitube into the mouth to prevent the cuff from tearing.

- v. With the other hand, hold the Combitube with the curve in the same directions as the curve of the pharynx. Insert the tip into the mouth and advance carefully until the printed ring is aligned with the teeth.

Caution: DO NOT FORCE THE COMBITUBE. If the tube does not advance easily, redirect it or withdraw and reinsert. Have suction available and ready whenever withdrawing tube.

- vi. If the Combitube is not successfully placed within 30 seconds, remove the device and hyperventilate the patient for 30 seconds using basic methods, as described in C above, before re-attempting insertion.

e. Inflation of Combitube

- vii. Inflate line 1, blue pilot balloon leading the pharyngeal cuff, with 100ml of air using the 140ml (cc) syringe. (This may cause the Combitube to move slightly from the patient's mouth).
- viii. Inflate line 2, white pilot balloon leading the distal cuff, with approximately 15ml of air using the 20ml (cc) syringe.

f. Ventilation

- ix. Begin ventilation through the longer blue (distal) tube. Watch for chest rise. If auscultation of breath sounds is positive and auscultation of gastric air sounds is negative, continue ventilation.
- x. If no chest rise, negative lung sounds, and/or positive gastric air sounds with ventilation through the distal tube, begin ventilation through the shorter clear (proximal) tube. Confirm ventilation with chest rise, presence of auscultated lung sounds, and absence of gastric air sounds.
- xi. If there is no chest rise or positive lung sounds through either tube, remove the device, hyperventilate the patient 20-30 seconds as described in C above, and repeat the insertion/inflation/ventilation procedures.
- xii. Continue to ventilate the patient through the tube, which resulted in lung sounds using a BVM or a manually triggered oxygen delivery value.

REASSESS TUBE PLACEMENT FOLLOWING EVERY PATIENT MOVEMENT.

g. If two consecutive attempts at intermediate airway placement fail to result in a proper placement and ventilation, do not attempt placement again. Ventilate the patient using basic methods and equipment.

h. Removal of Combitube - at direction of Medical Control or when attempting reinsertion, or if the patient awakens. Remove Combitube as follows: **Recommendation is to decompress the stomach prior to removal to decrease the probability of vomiting.**

- i. Have suction ready
- ii. *Decompress the stomach with suction
- iii. Deflate blue tube
- iv. Deflate white tube
- v. Remove Combitube
- vi. Be prepared for vomiting

**CONTINUE CPR AND VENTILATION AS APPROPRIATE DURING TRANSPORT.
CONTACT MEDICAL CONTROL FOR DIRECTION.**

***NOTE ON SUCTIONING THROUGH THE COMBITUBE:** When suctioning the patient through the Combitube, **always** introduce the suction catheter through Tube #2 (white). Because the Combitube will usually be in the esophagus, most through the tube suctioning will be gastric suctioning and will result in decreased gastric distension. In the event that the Combitube is in the trachea, suctioning of the patient's airway will result.

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

SKILLS LAB 1

ALLOTTED TIME: Approximately 2 hours

OBJECTIVES: Demonstrate placement of dual lumen airway devices.

Demonstrate the method of assuring and maintaining correct placement of dual lumen airway devices.

Demonstrate re-ventilation for missed placement of dual lumen airway devices.

EQUIPMENT NEEDED:

Combitubes7
Stethoscopes
Pulse oxymeter
Colormetric End Tidal CO
Bag valve masks
Airway manikins
Check-off sheets
Handouts

INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	NOTES
1. Discuss the advantages, disadvantages indications and contra-indications for using the dual lumen airway device..	1. Listen, discuss, take notes, following hand-out.	

INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	NOTES
2. Display a variety of currently available dual lumen airway device.	2. Observe instructor.	
3. Demonstrate placement of a dual lumen airway device and ventilate the manikin with it.	3. Observe instructor.	
4. Repeat demonstration while discussing the criteria and rationale check sheets.	4. Observe and follow along on the check sheet.	
5. Demonstrate and discuss commonly encountered problems and how to "trouble shoot" them.	5. Observe instructor, answer questions.	
6. Divide class into practice groups.	6. Practice placing the device in an airway manikin and provide ventilation.	
7. Check-off skills.	7. Check-off skills with instructor.	

EVALUATION/ASSESSMENT:

EMERGENCY MEDICAL SERVICES AGENCY ADVANCED AIRWAY MANAGEMENT PROGRAM

Emergency Medical Technician – Basic Pharyngeal Esophageal Airway Device (PEAD)

SKILLS LAB 2

ALLOTTED TIME: Approximately 2 hours

OBJECTIVES: Demonstrate on a manikin the proper technique for the and for maintenance of the following airway adjuncts:
 ? simple nasal canula
 ? non-rebreather masks
 Demonstrate sterile suctioning techniques on a manikin with a dual lumen airway in place.

EQUIPMENT NEEDED:

? Oxygen display	? Oxygen tanks
? Handouts on oxygen devices	? Wrenches
? Bag valve mask resuscitators	? Check off sheets
? Airway manikins	? Demand valve
? OPAs and NPAs	? Dual-lumen Airway
? Suction device w/catheters	? Sterile suction kits

INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	NOTES
1. Display oxygen delivery equipment such as masks, cannulas, and oxygen tanks.	1. Observe instructor, take notes.	
2. Discuss advantages, disadvantages, indications and contraindications for each device.	2. Observe, discuss, and take notes.	
3. Demonstrate ventilation of an airway manikin with: ? Bag valve mask	3. Observe demonstrations.	
4. Repeat demonstration while discussing criteria, and rationale	4. Observe, repeat demonstration while following on check off	

INSTRUCTOR ACTIVITY	STUDENT ACTIVITY	NOTES
check sheets.	sheets.	
5. Demonstrate sterile suctioning on a manikin with an dual lumen airway tube in place.	5. Observe, repeat demonstration while following on check off sheets.	
6. Divide class into practice groups.	6. Practice each skill as directed by instructor.	
7. Check off class on skills.	7. Check off's on: ? Oxygen therapy ? Bag valve mask ? Sterile suctioning	

EVALUATION/ASSESSMENT:

Ventilatory Management Using a Dual Lumen Airway Device

OBJECTIVE: The candidate must demonstrate the ability to place a dual lumen airway device within 30 seconds on an apneic patient.

EQUIPMENT: Adult intubation manikin, dual lumen airway device, securing strap, simple airway adjuncts, oxygen tank with regulator, oxygen tubing, body substance isolation, 35/50 cc syringes, lubricant, stethoscope, bag-valve-mask device, silicone spray, suction equipment, and a timer.

PERFORMANCE CRITERIA AND CONDITIONS: Given an adult intubation manikin and necessary equipment, the candidate will insert a dual lumen airway device within thirty seconds and within three attempts on an apneic patient scenario. All critical criteria must be demonstrated with 100% accuracy for acceptable performance.

Time limit: 5 minutes

*Note: If candidate elects to initially ventilate with BVM attached to reservoir and oxygen, full credit must be awarded for steps denoted by an ** as long as first ventilation is delivered within 30 seconds.*

Event	Does	Does Not
1. Takes or verbalizes body substance isolation precautions.		
2. Opens the airway manually.		
3. Elevates tongue, inserts simple adjunct (either oropharyngeal or nasopharyngeal airway).		
<i>Note: Examiner now informs candidate no gag reflex is present and patient accepts adjunct.</i>		
**4. Ventilates patient immediately with bag-valve-mask device unattached to oxygen within 30 seconds.		
**5. Hyperventilates patient with room air.		
<i>Note: Examiner now informs candidate that ventilation is being performed without difficulty.</i>		

Event	Does	Does Not
6. Attaches oxygen reservoir to bag-valve-mask device and connects to high flow oxygen regulator (12-15 liters/min).		
7. Ventilates patient in less than 30 seconds at a rate of 10-20 min. and volumes of at least 800 ml.		
<i>Note: After 30 seconds, examiner auscultates and reports breath sounds are present and equal bilaterally and medical control has ordered insertion of a dual lumen airway. The examiner must now take over ventilation.</i>		
8. Directs assistant to hyperventilate patient.		
9. Checks/prepares airway device.		
10. Lubricates distal tip of the device (may be verbalized).		
<i>Note: Examiner to remove OPA and move out of way when candidate is prepared to insert device.</i>		
11. Positions head properly.		
12. Performs a tongue-jaw lift.		
13. Inserts device in mid-line and to depth so that the printed ring is at level of teeth.		
14. Inflates pharyngeal cuff with proper volume and removes syringe.		
15. Inflates distal cuff with proper volume and removes syringe.		
16. Attaches/directs attachment of BVM to the first (esophageal placement) lumen and ventilates within 30 seconds.		
17. Confirms placement and ventilation through the correct lumen by observing chest rise, auscultation over the epigastrium and bilaterally over each lung.		
<i>Note: The examiner states, You do not see rise and fall of the chest and hear sounds only over the epigastrium.</i>		
18. Attaches/directs attachment of BVM to the second (endotracheal placement) lumen and ventilates within 30 seconds.		

Event	Does	Does Not
19. Confirms placement and ventilation through correct lumen by observing chest rise, auscultation over the epigastrium and bilaterally over each lung.		
<i>Note:</i> The examiner confirms adequate chest rise, absent sounds over the epigastrium, and equal bilateral breath sounds.		
20. Secures device or confirms that the device remains properly secured.		

CRITICAL CRITERIA

- ___ Did not take or verbalize body substance isolation precautions
- ___ Failure to initiate ventilations within 30 seconds after taking BSI precautions
- ___ Interrupts ventilations for greater than 30 seconds at any time
- ___ Failure to voice and ultimately provide high oxygen concentrations
- ___ Failure to ventilate patient at rate of at least 10/minute
- ___ Failure to provide adequate volumes per breath (maximum 2 errors/minute permissible)
- ___ Failure to hyperventilate patient prior to placement of the dual lumen airway device
- ___ Failure to have suction equipment readily available
- ___ Failure to insert the dual lumen airway device at a proper depth or at either proper place within 3 attempts
- ___ Failure to inflate both cuffs properly
- ___ Failure to remove the syringe immediately after inflation of each cuff
- ___ Failure to confirm that the proper lumen of the device is being ventilated by observing chest rise, auscultation over the epigastrium, and bilaterally over each lung
- ___ Inserts any adjunct in a manner dangerous to patient