



Oxygenation

Pea Ridge Fire Department
EMS Refresher

Oxygenation

- Process of loading oxygen molecules onto hemoglobin molecules in the bloodstream
- Requires adequate fraction of inspired oxygen (F_{IO_2})

Supplemental Oxygen Therapy

- Administer to any patient with potential hypoxia.
 - Indications
 - Respiratory distress
 - Suspected or documented hypoxemia
 - Oxygen-delivery method
 - Appropriate for the patient's ventilatory status
 - Reassess frequently.
 - Adjust based on clinical condition and breathing adequacy.

Oxygen Sources

- Oxygen cylinders
 - Stores pure oxygen
 - Check label and test date.
 - Various sizes
 - Oxygen delivery is measured in L/min.



Oxygen Sources

- Oxygen cylinders (cont'd)
 - Replace cylinder when pressure falls to 200 psi or lower.
 - Using the pressure and flow rate, you can calculate how long the supply will last.

Safety Reminders

- Keep combustible materials away.
- No smoking
- Store in a cool, ventilated area.
- Use only with a properly fitting regulator valve.
- Close all valves when not in use.
- Secure cylinders.
- Position yourself to the cylinder's side.
- Have the cylinder hydrostat tested every 10 years.

Oxygen Regulators and Flowmeters

- High-pressure regulators deliver gas under high pressure.
 - Pressure is approximately 2,000 psi.
 - Therapy regulator controls flow to patient.
 - Reduces to 50 psi

Oxygen Regulators and Flowmeters

- Flowmeters allow oxygen to be adjusted.
 - Pressure-compensated flowmeter
 - Bourdon-gauge flowmeter



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Preparing an Oxygen Cylinder for Use

- Before administering oxygen, prepare cylinder and therapy regulator.
- Procedure
 - Inspect cylinder then “crack”.
 - Attach regulator/flowmeter to valve stem.
 - Place regulator collar.
 - Open cylinder and read pressure on regulator gauge.
 - Select flow rate.

Preparing an Oxygen Cylinder for Use



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Nonrebreathing Mask

- Preferred in prehospital setting
 - 90% to 100% oxygen
 - Mask, reservoir bag
- Indications
 - Spontaneously breathing patients
- Contraindications
 - Apnea and poor respiratory effort



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Nasal Cannula

- Two small prongs
 - 24% to 44% oxygen
- Best for patients who need long-term therapy
- Ineffective with:
 - Apnea
 - Poor respiratory effort
 - Severe hypoxia
 - Mouth breathing



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Partial Rebreathing Mask

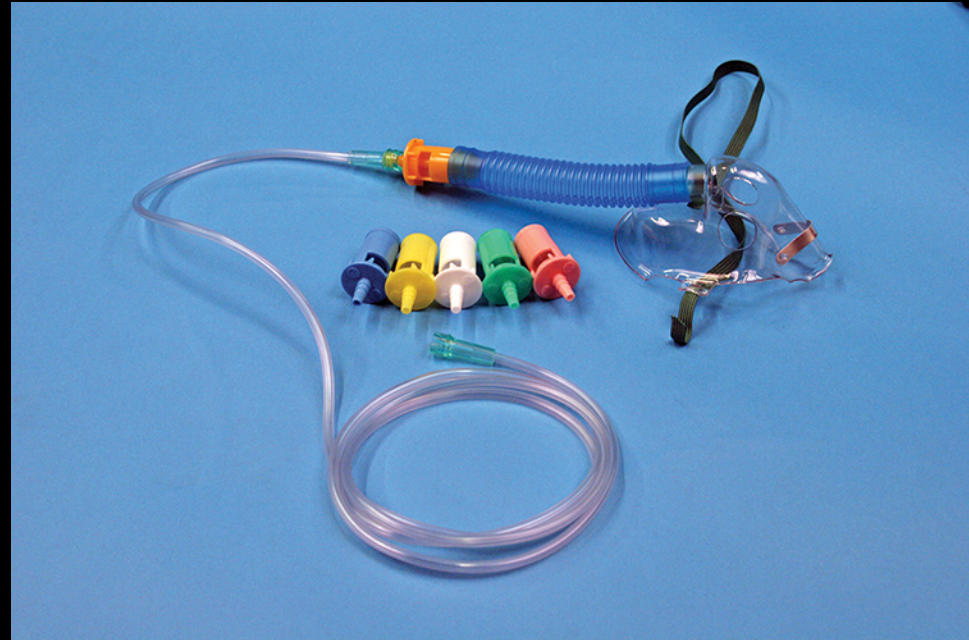
- Lacks one-way valve
- Flow rates of 6 to 10 L/min
- 35% to 60% oxygen



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Venturi Mask

- Draws room air into the mask along with oxygen
- Can deliver 24%, 28%, 35%, or 40% oxygen



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Oxygen Delivery Devices

Table 15-9		Oxygen-Delivery Devices
Device	Flow Rate	Oxygen Delivered
Nasal cannula	1–6 L/min	24%–44%
Partial rebreathing mask	6–10 L/min	35%–60%
Nonrebreathing mask	15 L/min	Up to 90%
Bag-mask device with oxygen reservoir	15 L/min	Nearly 100%
Mouth-to-mask device	15 L/min	Nearly 55%

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Tracheostomy Masks

- Cover the stoma and have a strap that goes around the neck
 - To improvise, place a face mask over the stoma.



Oxygen Humidifier

- Bottle of sterile water moisturizes oxygen
 - Keep upright; only practical with fixed unit on ambulance.
 - Can be source of infection



Bag-Mask Device

- Can deliver nearly 100% oxygen
- Can provide adequate tidal volume when used by an experienced paramedic



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Thank You

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