





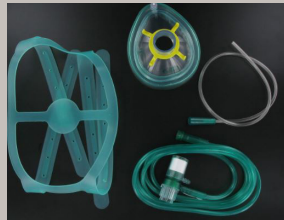


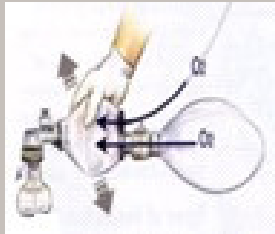


COVID-19 OXYGEN THERAPY

OXYGEN (O ₂) THERAPY DEVICES FOR ADULTS															
LOW-FLOW SYSTEM						RESERVOIR SYSTEM		HIGH-FLOW SYSTEM							
The patient's respiration pattern affects the fraction of inspired oxygen. O ₂ delivered at flow rate of 8L/minute or less, directly into the airway.						Stores oxygen in the reservoir bag between breaths, thereby delivering a higher fraction of oxygen than a low-flow system.		Uses an air delivery system or a blending system to mix air and oxygen before the FiO ₂ enters the patient's airway. The oxygen flows out of the device into the patient's airways in an amount sufficient to meet all inspiratory volume requirements. These devices are not affected by a patient's respiratory pattern.							
O ₂ device	Nasal cannula					Partial rebreathing	Non-rebreather	Venturi mask	Frugal non-invasive CPAP			High-flow nasal cannula system (AirVO)	T-piece	Bag-valve-mask	
															
Flow rate	2L	3L	4L	5L	6L	6-10L Enough to keep the reservoir bag inflated	6-10L Enough to keep the reservoir bag inflated	4-10L	10L	15L/connect directly to O ₂ inlet	5-30L Set according to desired PEEP	2-60L	8-10L	Room air – 15L Enough flow to keep the reservoir bag inflated	
%O ₂	28%	32%	36%	40%	44%	35-60%	55-70%	24-60%	30%	30, 60, 90%	70-100%	35-90%	30-100%	21-100%	
PEEP	None					None	None	None	5-10cmH ₂ O	5-15cmH ₂ O	5-10cmH ₂ O	None	Depends on the length of the expiration tube	Depending on adjustable PEEP valve	
Advantages	<ul style="list-style-type: none">Well toleratedEasy to applyLow costCan eat and talk without interrupting O₂ therapy					<ul style="list-style-type: none">Quick and easy to applyInexpensive		<ul style="list-style-type: none">Precise FiO₂ can be deliveredWell tolerated		<ul style="list-style-type: none">No electricity requiredEliminate need of an artificial airwayDecrease work of breathingOffer constant positive pressure in the patient's airwayPossibility to connect nebulizerSafe, continuous use for 10-12 hoursPrevent atelectasisNo risk of volutrauma/barotrauma		<ul style="list-style-type: none">Oxygenation and ventilation improveWork of breathing decreases in acute lung injury (ALI)Well toleratedPortableWashout of anatomical dead space		<ul style="list-style-type: none">Humidified airComfortableFiO₂ fairly accurateWeaning method from ventilator	
Considerations	<ul style="list-style-type: none">Observe tolerance and comfortNasal prongs to be positioned in the nasal openingsMonitor pressure areas on patient's ears					<ul style="list-style-type: none">The non-rebreather has a one-way valve between the bag and the mask, and flaps over the exhalation holes. The partial rebreather does not have thisPotential suffocation hazard – you need to ensure an adequate flow of oxygenCan lead to an increase in the patient's PCO₂. Monitor patient's response and alertness. If drowsy, or difficult to rouse, report to senior healthcare providerCold and dry oxygen often leads to the drying out of the oral and nasal mucosa		<ul style="list-style-type: none">Room air enters at connection and mixes with O₂Litre and % guide displayed on connectionDo not cover the openings of the coloured connection or use any flow rate other than what is indicated on the connection, as this will influence the % of oxygen that is delivered to the patient		<ul style="list-style-type: none">Patient must be haemodynamically stable and alertEnsure correct size and proper seal (not too tight)Maintain skin integrityStay with patient: high risk of aspiration and requiring support with activitiesMonitor for abdominal distentionNutrition: involve teamNebulization at 8L with an additional flow rate meterConsider HME filterRoom air enters at connection and mixes with the O₂Litre and % guide displayed on the bottom of the connection		<ul style="list-style-type: none">Aerosol-generating procedureHigh-flow rate meters requiredEnsure that nasal prongs used are the correct sizeDisconnection, obstruction or displacement from the nares in an acutely hypoxic patient can lead to cardiac arrestSimultaneous running of a number of these devices, all at 60L/min, can lead to a rapid depletion of the hospital's oxygen supply and should be discussed with the Technical Manager		<ul style="list-style-type: none">Expiratory tube not too long/short – can increase the patient's work of breathingThis can be quite heavy – and can lead to a significant amount of pulling on either the ETT or the tracheostomy, with accidental extubation/displacementEnsure prescribed temperature and water level of the humidifier to prevent discomfort and burns	
Goal of O ₂ therapy:						Adverse effects of oxygen therapy may include:									
To provide a sufficient concentration of inspired oxygen and to promote cellular oxygenation.						Hyperoxygenation, oxygen toxicity, respiratory depression in COPD, carbon dioxide retention, absorption atelectasis, and/or eye damage in infants									
Nursing considerations:						Nursing Management:									
Oxygen is akin to a drug – and should be managed in the same way. It is not without risks. Give the lowest possible concentration for the most desired effect. Be considerate of the patient's diagnosis and monitor ventilation and alertness carefully.						Ensure that the oxygen apparatus is in working order and that the mask is clean. Explain the procedure to the patient and obtain verbal consent. Position your patient optimally. Administer the least amount of oxygen required to achieve the most therapeutic effect/ensure O ₂ is administered as ordered. Confirm that O ₂ therapy devices are properly positioned. Monitor patient tolerance of therapy (observations, comfort and improved oxygenation status). Periodically monitor oxygen saturation levels by using pulse oximetry. During meals, consider alternative O ₂ delivery where required, e.g. nasal cannula if tolerated. Transport patient with oxygen when on oxygen therapy. Give support and education to the patient on the correct use of the device as required. Observe for complication of oxygen therapy.									

References:
Hinkle, J.L. & Cheever, K.H. 2014. Brunner & Suddarth's Textbook of Medical-surgical nursing. 13th Edition. Lipincott Williams & Wilkins: Philadelphia.
Mediclinic. 2020. Basic nursing procedure (TR3143). SOPBP10. Administer Oxygen therapy. Stellenbosch: Mediclinic (Pty) Ltd.
Mekontso Dessap, A. 2019. Frugal innovation for critical care. Intensive Care Med. 45(2):252-254.
Muller M., Jobert, A., & Olivier, N. 2020. Practical guide for General nursing science. 2nd Edition. Pearson:Cape Town.
Spiker, E.E., de Bont, M., Bax, M. & Sandel, M. 2013. Practical use, effects and complications of prehospital treatment of acute cardiogenic pulmonary edema using the Boussignac CPAP system. International Journal of Emergency Mediclinic, 6(8). Available at <http://www.intjem.com> Accessed [2020, July 6].
Urden, L.D., Stachy, K.M., and Lough, M.E. 2020. Critical care nursing diagnosis and management. 8th Edition. Elsevier: Canada.
Waugh, A & Grant A. 2014. Ross and Wilson Anatomy & Physiology in Health and Illness. 12 Edition. Elsevier: China.