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BEYOND EXCEPTIONAL MEDICINE™

MODERATE PROCEDURAL SEDATION and ANALGESIA

A SELF-DIRECTED ONLINE LEARNING MODULE

Credentialed clinicians seeking Moderate Sedation privileges
should complete this module

KMC, Policy # CP3-142

Requirements for (re)credentialing Non-Anesthesia medical clinicians for Moderate Sedation at KMC

1. **Current AHA ACLS card**
2. **6 proctored cases** for initial credentialing
3. **10 cases within a 24-month period** for re-credentialing
4. **Completing the online educational module and successfully completing the test**

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MODERATE SEDATION:

LEARNING OBJECTIVES

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MODERATE SEDATION:

PRINCIPLES & THE SEDATION CONTINUUM

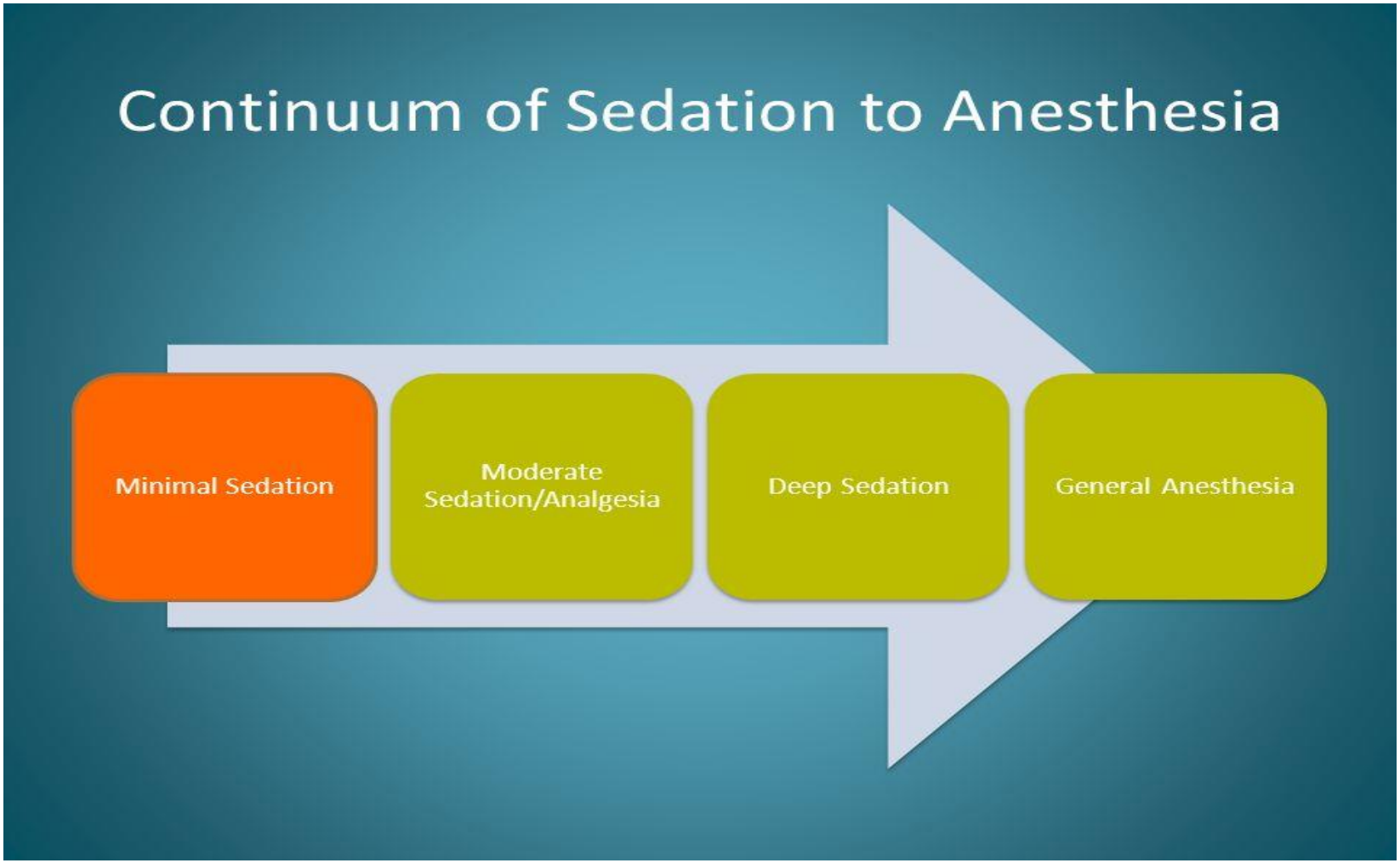
Goals of Moderate Sedation/Analgesia

- Provide sedation and/or relief of anxiety
- Provide pain control
- Maintain consciousness and patient cooperation
- Achieve control of patient's physiologic parameters

Characteristics of Patients under Moderate Sedation

- Patient is cooperative
- Patient is conscious
- Anxiety is controlled
- Amnesia may be present
- Vital signs are stable
- Protective reflexes are intact
- The risk of complications is reasonably low
- None to infrequent post-sedation complications

The Sedation Continuum



2014 ASA Sedation Continuum

	Mild Sedation	Moderate Sedation	Deep Sedation	General Anesthesia
Responsiveness	**Normal response** to verbal stimulation	**Purposeful**** response to verbal or tactile stimulation	**Purposeful**** response following repeated or painful stimulation	**Unarousable** even with painful stimulus
Airway	**Unaffected**	**No intervention** required	Intervention **may be** required	Intervention **often** required
Spontaneous Ventilation	**Unaffected**	**Adequate**	**May be** inadequate	**Frequently** inadequate
Cardiovascular Function	**Unaffected**	**Usually** Maintained	**Usually** maintained	**May be** impaired

** Reflex withdrawal from a painful stimulus is NOT considered a purposeful response

The Sedation Continuum

- Sedation is a continuum
- Patients can quickly move from one level of sedation to another
- The response to sedation varies from one patient to another
- Individuals administering Moderate Sedation should be able to rescue patients who enter a state of Deep Sedation

Continuum of Depth of Sedation: Definition of General Anesthesia and Levels of Sedation/Analgesia
Developed By: Committee on Quality Management and Departmental Administration
Last Amended: October 15, 2014 (original approval: October 13, 1999)

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MODERATE SEDATION:

REQUIREMENTS

Requirements for Moderate Sedation

- Credentialed clinicians
- Equipment and Emergency support
- Pre-Sedation Assessment
- Pre-Sedation Checklist and Pre sedation Patient Evaluation
- Moderate sedation administration
- Patient monitoring and documentation
- Post sedation Assessment
- Post sedation Recovery
- Post Sedation Disposition

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Categories of healthcare clinicians who can administer Moderate Sedation

- Attending clinician credentialed for the specific procedure and moderate sedation
- Competency Validated RN fully dedicated for moderate sedation monitoring and administration

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Required Equipment and Emergency Support

- Pulse oximeter, Blood Pressure and ECG with print capabilities.
- Capnography
- Oxygen source
- Suction device
- IV supplies including IV fluid bag, IV tubing and IV pump
- Moderate sedation medications (midazolam and fentanyl)
- Antagonists for moderate sedation medications (flumazenil and naloxone) should be immediately available
- Airway rescue equipment including mask/nasal cannula, bag-valve-mask device (AMBU Bag), oral/nasal airway, Laryngeal Mask Airway (LMA) and intubation equipment
- Crash Cart in the immediate vicinity
- Code button and or telephone in the immediate vicinity

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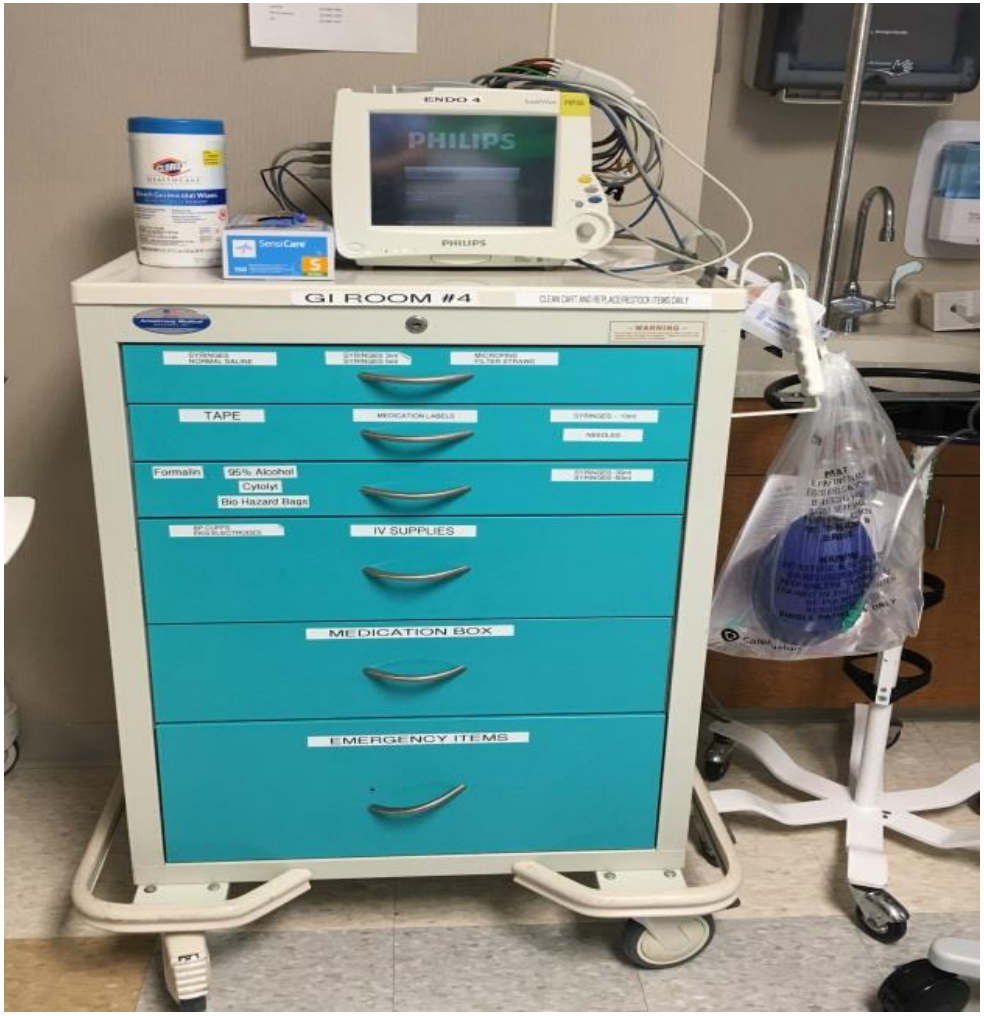
Required Equipment and Emergency Support

Monitors

1. Noninvasive BP
2. ECG
3. Capnography
4. Pulse oximeter

Moderate Sedation Cart

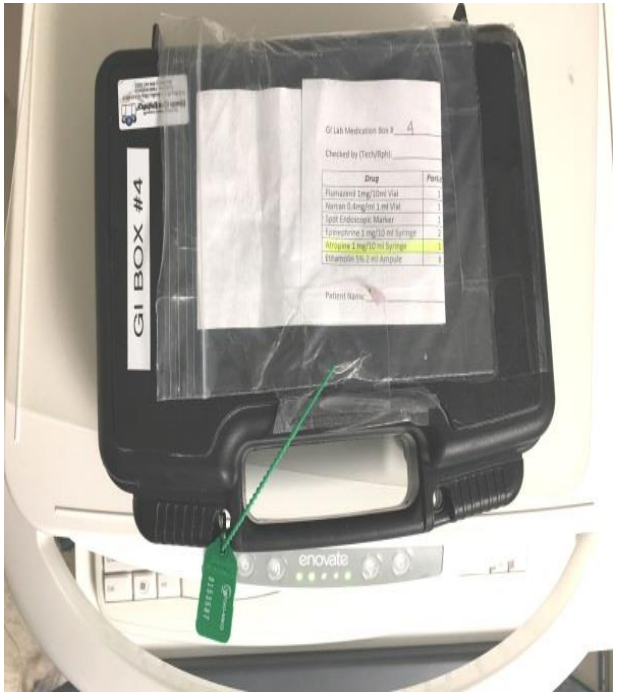
Though not required, a moderate sedation cart can be quite helpful



Moderate Sedation Medications and Reversal Agents

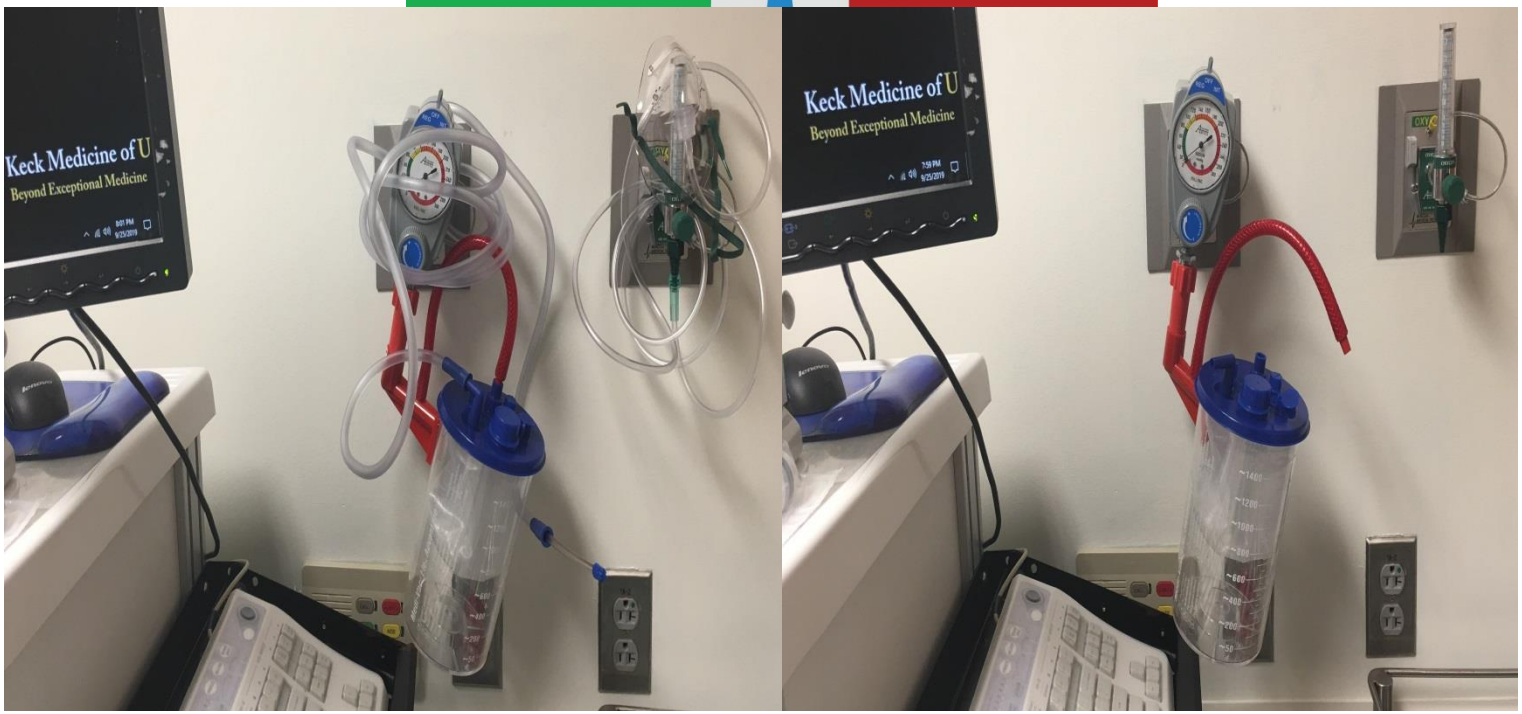
- Moderate sedation medications and reversal agents should be immediately available either in a:

Pyxis Machine **Or a** **Medication Box**



Oxygen Delivery Device and Suction Device

WARNING:
All appropriate equipment should be present before case starts and immediately available for use



Oxygen delivery devices

- Evidence based medicine supports the routine use of supplemental oxygen during moderate procedural sedation/analgesia unless specifically contraindicated for a particular patient or procedure

- The use of supplemental oxygen versus no supplemental oxygen is associated with a reduced frequency of hypoxemia

- The literature is insufficient to examine which methods of supplemental oxygen administration (e.g., nasal cannula, face mask, or specialized devices) are more effective in reducing hypoxemia

Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018. A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology, Anesthesiology 2018; 128:437-79

Nasal Cannula

- O2 fills the nasal passages and nasopharynx (Nasal O2 reservoir)
- O2 diffuses from the nasal O2 reservoir to laryngopharynx increasing the inspired FiO2
- Requires patent nasal passages
- Patient does NOT have to breathe through the nose

Nasal Cannula

- Flow rate is 1-6 LPM
- FiO2 increases by about 0.3 /LPM
- FiO2 decreases with increase in Minute ventilation
- Flow > 6 LPM will not increase the FiO2 any further because the Nasal O2 reservoir gets fully saturated at 6LPM
- Flow> 6LPM can cause Mucosal dryness and irritation

LPM	FiO2 equivalent
1	0.24
2	0.27
3	0.30
4	0.33
5	0.36
6	0.40

Simple Face Mask

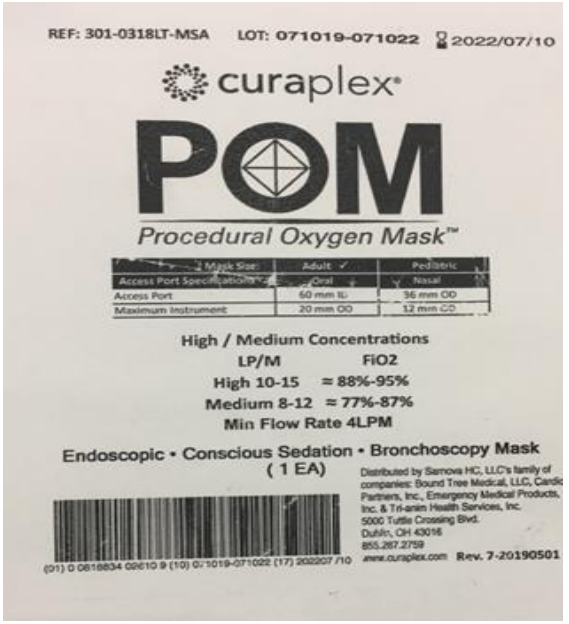
- Creates an oral O2 reservoir increasing the inspired FiO2
- The minimum O2 flow is 5 LPM to avoid rebreathing of CO2

Simple Face Mask

- 5- 10 LPM
- FIO2 0.35 – 0.55 (about 0.3 / LPM flow)
- FiO2 decreases with increase in Minute ventilation

Flow	FiO2 equivalent
5	0.35
6	0.38
7	0.41
8	0.44
9	0.47
10	0.50

Procedural Oxygen Mask



Emergency Airway Cart and intubation Equipment

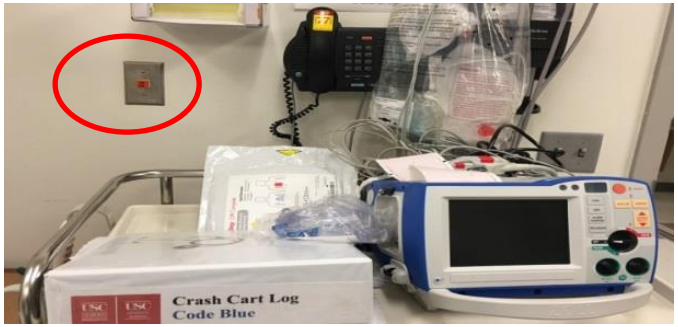
Know how to call a Code Blue

CALL “77” ON WORK PHONE & INFORM OPERATOR OF CODE BLUE LOCATION

or

PRESS CODE BLUE BUTTON ON WALL IF AVAILABLE

Know where they are and what they look like PRIOR to the start of a case



Crash Cart

Know where they are prior to the start of a case

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MODERATE SEDATION:

PRE-SEDATION ASSESSMENT

Pre-Sedation Assessment

A sedation-credentialed clinician will perform and document an appropriate patient assessment prior to the administration of moderate sedation.

The pre-sedation assessment must be documented in a pre-sedation note

KMC, Policy # CP3-142

Components of the Pre-Sedation Assessment

- Document informed consent
- Review history and physical with emphasis to the cardiac and pulmonary systems
- Prior anesthesia or sedation complications
- Drug Allergies
- Vital signs, level of consciousness, heart and lung exam
- Airway assessment
- Sedation risk assessment
- Procedural Sedation Management Plan

Pre-Sedation Assessment documentation example part 1

PRE SEDATION EVALUATION NOTE

I evaluated the patient on September 10, 2019 10:36 AM .

CONSENT

Sedation options, pre-procedure education, benefits, risks and alternatives have been discussed with the patient.
The risks discussed included loss of protective reflexes, aspiration, pneumonia and life threatening events: Yes.
Questions were answered and the patient chose to proceed with the planned procedure under moderatesedation.
Signed sedation consent on chart: Yes
Signed procedure consent on chart: Yes

REVIEW OF HISTORY & PHYSICAL

I have reviewed the H&P, medications list and recent labs as documented in the medical record: Yes

Problems List

CAD in native artery
Diabetes
Erectile dysfunction
Former tobacco use
History of heart artery stent
History of Helicobacter pylori infection
Hypertension
Morbid obesity
Positive fecal occult blood test
Thumb pain

ANESTHESIA, DRUG & ALLERGY HISTORY

Prior Anesthesia or Sedation Complications: No
I have reviewed the ALLERGIES as reported by the patient **and listed in the chart**: Yes

Allergies (1) Active	Reaction
No Known Medication Allergies	None Documented

Pre-Sedation Assessment documentation example part 2

Allergies (1) Active **Reaction**
No Known Medication Allergies None Documented

FOCUSED PATIENT INTERVIEW & PHYSICAL EXAMINATION

Vital Signs
No qualifying data available.

Level of Consciousness: Alert and Oriented
Lungs clear Bilaterally: Yes
Regular Heart rate: Yes
Peripheral Pulses Strong/Equal: Yes

AIRWAY ASSESSMENT
Modified Mallampati Score: Class II: Soft palate, uvula, fauces visible.
Mouth Opening Greater than 4cm: Yes
Thyromental Distance Greater than 6cm: Yes
Adequate Neck Extension/Flexion: Yes

SEDATION RISK ASSESSMENT
ASA Physical Status Classification: ASA II - A patient with mild systemic disease
Emergent Case: No

The Patient is an appropriate candidate for moderate sedation: Yes

PROCEDURAL SEDATION MANAGEMENT PLAN
Plan of Sedation/Drug(s) to be used: Fentanyl and Midazolam
Have the following reversing agents immediately available: Naloxone and Flumazenil

Anticipated post-sedation needs: Standard post sedation monitoring and care.

.sedation.note

Signature Line
Electronically Signed On 09/10/19 10:37 AM PDT

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MODERATE SEDATION:

AIRWAY ASSESSMENT

Airway Assessment

- Meticulous airway assessment is crucial for safe administration of moderate sedation
- Assessment includes history and examination of the Airway

History

"The best predictor of future behavior is past behavior"

- History of a difficult airway is highly predictive
- Stridor, Airway surgery, Obstructive Sleep Apnea are red flags for a difficult airway

Airway Tests

No single clinical test reliably excludes a potentially difficult intubation

Michael E Detsky, Naheed Jivraj, Neill K Adhikari et al (2019) Will This Patient Be Difficult to Intubate?: The Rational Clinical Examination Systematic Review. JAMA. 2019 Feb 5;321(5):493-503

Airway Tests

1. Modified Mallampati Score
2. Thyro mental distance
3. Range of Motion of the neck
4. Neck circumference
5. Inter incisor gap
6. Upper Lip Bite Test
7. 3-3-2 Test

Mallampati Score

- Assesses the size of the base of the tongue relative to the size of the oropharynx
- The examination is conducted with the patient in a sitting position
- The patient's head is maintained in a neutral position and the mouth is opened as wide as possible and the tongue protruded
- The patient is encouraged NOT to phonate during the examination
- Classification is based on a description of the anatomic area visualized

Modified Mallampati Classification

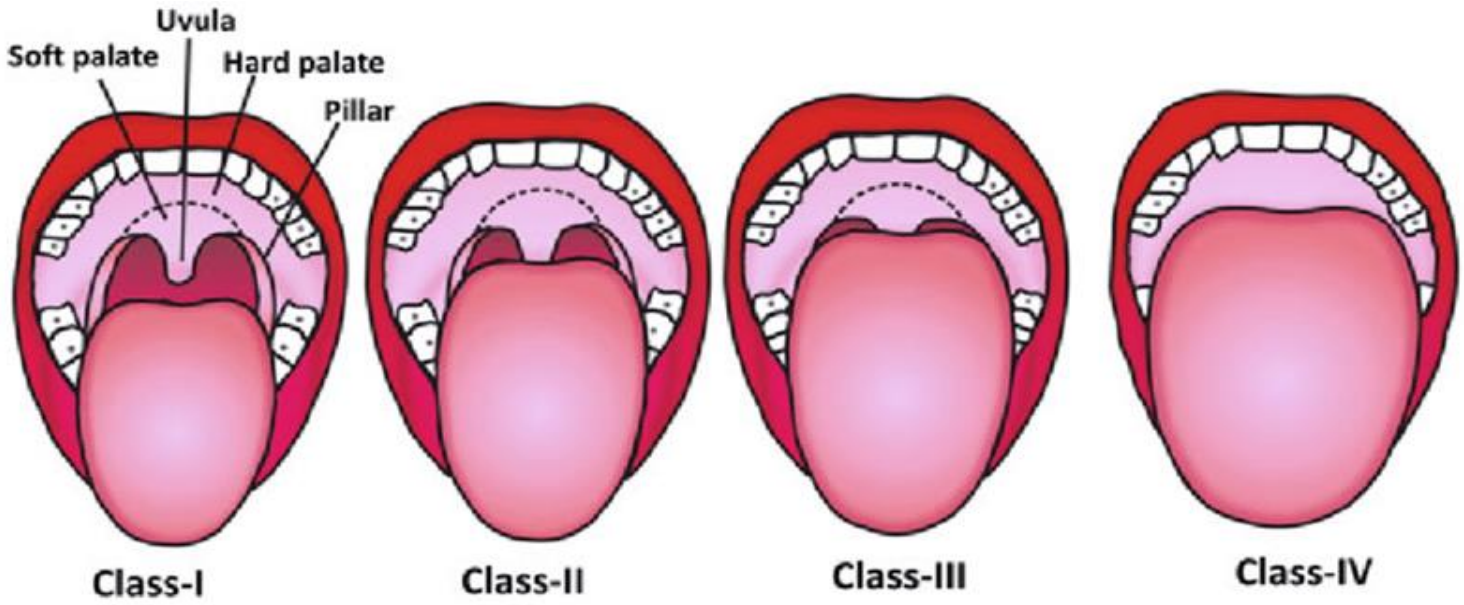
Class I: Entire uvula is easily visualized together with the soft palate and tonsillar pillars

Class II: More than the base of the uvula is visualized along with the soft palate. Tonsillar pillars not visualized

Class III: Only the base of the uvula visualized along with the soft palate

Class IV: No visualization of the uvula or soft palate

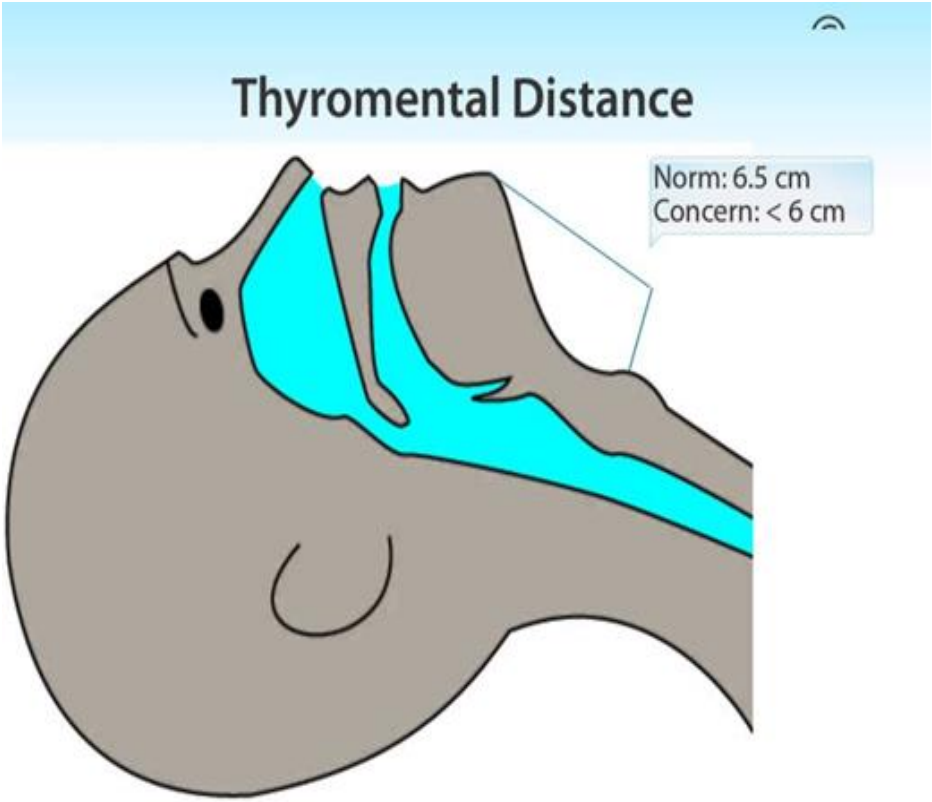
Mallampati Classification



Class I and II *generally* predict ease to ventilate and intubate
Class III and IV *sometimes* predict difficult airway
Mallampati test has low interobserver reliability (ability to get the same score when done by 2 different observers) and predictive value and has to be used as part of other airway tests to confirm or rule out difficult airway

Thyromental Distance

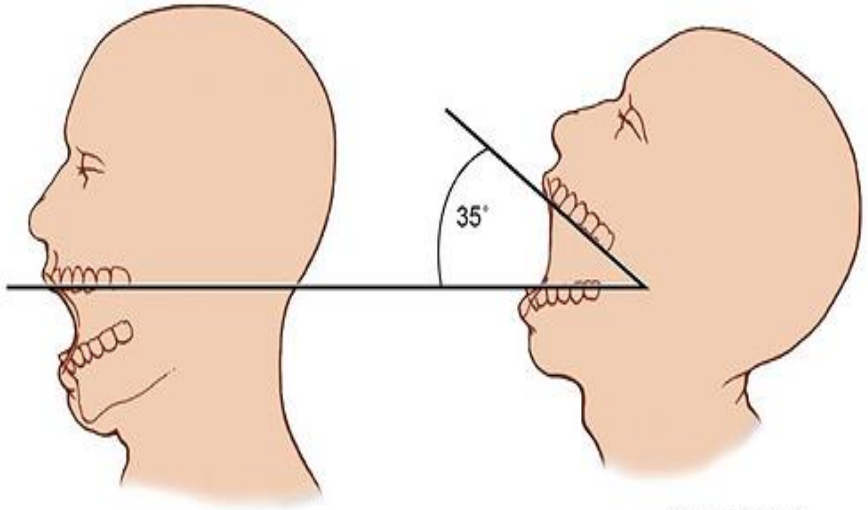
- Distance from thyroid cartilage to the mentum.
- TMD > 6 cm predicts easy intubation
- TMD < 6 cm correlates with intubation difficulty
- 3 finger breadths is commonly cited as corresponding to 6 cm
- The mean width of the middle three fingers is 5.38 cm for women and 5.91 cm for men



Hagberg and Benumof's Airway Management, 4th edition, 2018

Neck Mobility

- Normal atlanto-occipital extension measures 35 degrees
- Limitation of extension is an indication of potential difficulty with Direct Laryngoscopy (DL)



Grade	Reduction of atlantooccipital joint extension
1. No appreciable reduction of extension	None
2. Approximately 1/3 reduction	1/3
3. Approximately 2/3 reduction	2/3
4. No appreciable extension	Complete

Hagberg and Benumof's Airway Management, 4th edition, 2018

Neck Circumference (NC)

- Normal neck circumference in cm = Body weight in Kg/2
- Normal NC in a 70 Kg adult = 35 cm
- **> 43 cm (16.9 in)** predicted difficult intubation with a sensitivity of 92%, specificity of 84%, and PPV of 37%*

*Hagberg and Benumof's Airway Management, 4th edition, 2018

Inter-incisor Gap

- Normally more than 5 cm (3 fingerbreadths)
- > 4 cm predicts easy intubation as it allows a 3 cm deep flange of the laryngoscope blade to be inserted in the oral cavity
- < 3 cm predicts difficult laryngoscopy
- < 2 cm predicts difficult LMA insertion

Upper Lip Bite Test (ULBT)

Asking the patient to bite his or her upper lip

Class 3 ULBT predicts difficult intubation

Class 3 ULBT raises the probability of difficult intubation from 10% to greater than 60% for the average-risk patient

Michael E Detsky, Naheed Jivraj, Neill K Adhikari et al (2019) Will This Patient Be Difficult to Intubate?: The Rational Clinical Examination Systematic Review. JAMA. 2019 Feb 5;321(5):493-503

The 3-3-2 Rule

Functions to estimate whether the anatomy of the neck will allow for appropriate opening of the throat and larynx. It serves to roughly estimate if the alignment of the openings for direct visualization of the larynx is possible given anatomical findings.

A. Inter-incisor gap ≥ **3** finger breadths
B. Hyomental distance ≥ **3** Finger breadths
C. Hyothyroid distance ≥ **2** finger breadths

Predictors of difficult mask ventilation “OBESE”

1. **O**besity, **O**bstruction (Neck mass, Airway edema)
2. **B**earded
3. **E**lderly
4. **S**noring, **S**tiff Neck (Diabetes, Rheumatoid disease, ankylosing spondylitis)
5. **E**dentulous

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MODERATE SEDATION:

FASTING REQUIREMENTS

Fasting

Pre-Sedation Fasting

- Required to avoid aspiration
- Clear liquids* up to 2 hours before sedation
- Solids and non-human milk up to 6 hours
- Fried foods, fatty foods, or meat may need up to 8 hours of fasting
- Patients at high risk of aspiration might need longer fasting periods

* Examples of clear liquids include water, and fruit juices without pulp, carbonated beverages, carbohydrate rich nutritional drinks, clear tea, and black coffee

* Drinks containing alcohol can considerably delay emptying of the stomach and are not part of clear liquids

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures, An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration, Anesthesiology 2017; 126:376-93

Factors that Increase Risk of Aspiration and Require Longer Fasting Periods

- Pregnancy
- Obesity
- Diabetes
- Hiatal hernia
- Gastroesophageal reflux disease
- Bowel obstruction
- Enteral tube feeding
- Emergency care

Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures, An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration, Anesthesiology 2017; 126:376-93

Is it Safe to Chew Gum?

- Although the ASA guidelines do not explicitly mention chewing gum, it is typically considered a non-clear liquid
- Although chewing gum before surgery increases the production of saliva and thus the volume of stomach liquids, it does not affect the level of stomach acidity in a way that would elevate the risk of complications
- It is safe to administer sedatives or anesthesia to patients who have chewed gum while fasting before surgery unless patient has risk factors for aspiration

ANESTHESIOLOGY™ 2014 annual meeting,
Coffee, Cigarettes, Chewing Gum – Myths and Facts About Preoperative Fasting, Anasthesiol Intensivmed Notfallmed Schmerzther. 2019 Feb;54(2):142-145. doi: 10.1055/s-0043-124943. Epub 2019 Feb 15

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MODERATE SEDATION:

ASA CLASSIFICATION & EMERGENT CASES

ASA Physical Status Classification

ASA I	Healthy patient No systemic disease	Not a smoker or drinker
ASA II	Mild to moderate systemic disease	Controlled HTN, controlled DM, CKD, Obesity
ASA III	Severe systemic disease with some functional limitation but not incapacitating or representing threat to life	Uncontrolled HTN uncontrolled DM Renal failure on dialysis Morbid obesity Stable CAD
ASA IV	Severe systemic disease that's is either incapacitating or presents a constant threat to life	Renal failure not yet on dialysis End stage liver disease Unstable Angina Acute coronary syndrome
ASA V	A moribund patient not expected to survive within 24 hours without the operation or procedure	Ruptured aortic aneurysm

Which Patients Benefit from an Anesthesia Consultation?

Though not required, it is recommended to consider consultation with anesthesia for the following:

- ASA IV Classification
- Chronic pain patients
- Patients with potential difficult airway
- Patients with history of sedation complications
- Patients with abnormal function of major organs (severe COPD, CAD and CHF)

KMC, Policy # CP3-142

Emergency Cases

- Anesthesiology consultation prior to sedation is strongly recommended for airway protection

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MODERATE SEDATION:

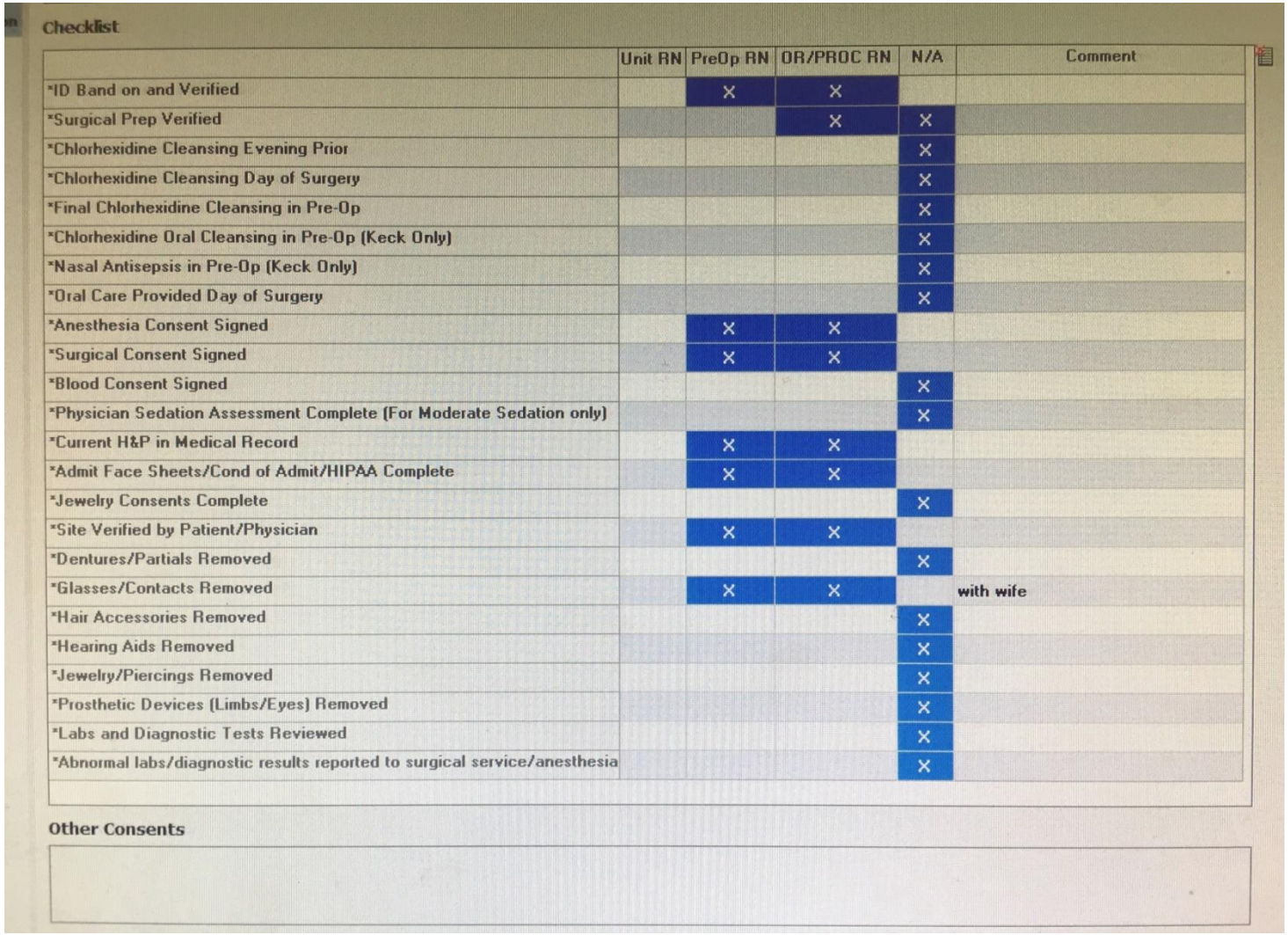
PRE-PROCEDURE CHECKLIST & EVALUATION

Pre-procedure Checklist

Performed by the moderate sedation-credentialed RN:

- NPO status
- Presence of the credentialed clinician's pre-sedation note
- Verification of appropriate transportation if the patient to be discharged home

Pre-procedure Checklist Example



Checklist

	Unit RN	PreOp RN	OR/PROC RN	N/A	Comment
*ID Band on and Verified		X	X		
*Surgical Prep Verified			X	X	
*Chlorhexidine Cleansing Evening Prior				X	
*Chlorhexidine Cleansing Day of Surgery				X	
*Final Chlorhexidine Cleansing in Pre-Op				X	
*Chlorhexidine Oral Cleansing in Pre-Op (Keck Only)				X	
*Nasal Antisepsis in Pre-Op (Keck Only)				X	
*Oral Care Provided Day of Surgery				X	
*Anesthesia Consent Signed		X	X		
*Surgical Consent Signed		X	X		
*Blood Consent Signed				X	
*Physician Sedation Assessment Complete (For Moderate Sedation only)				X	
*Current H&P in Medical Record		X	X		
*Admit Face Sheets/Cond of Admit/HIPAA Complete		X	X		
*Jewelry Consents Complete				X	
*Site Verified by Patient/Physician		X	X		
*Dentures/Partials Removed				X	
*Glasses/Contacts Removed		X	X		with wife
*Hair Accessories Removed				X	
*Hearing Aids Removed				X	
*Jewelry/Piercings Removed				X	
*Prosthetic Devices (Limbs/Eyes) Removed				X	
*Labs and Diagnostic Tests Reviewed				X	
*Abnormal labs/diagnostic results reported to surgical service/anesthesia				X	

Other Consents

Pre-Sedation Evaluation

- Immediately before administering sedation
- The competency-validated RN will perform and document the pre sedation evaluation

KMC, Policy # CP3-142

Pre-Sedation Evaluation

- **Vital Signs**
- Rapid **Pain** Assessment
- Baseline Modified **Aldrete Score**
- Baseline **RASS Score**
- **Safety interventions**
- **Equipment Safety Checks**
- **Pre-procedure cardiac rhythm strip**

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MODERATE SEDATION:

ROLES & RESPONSIBILITIES

Role of the Attending Clinician

- Pre-sedation Assessment (Must be complete before the initiation of the procedure and documented in the pre-sedation note)
- Immediately available during the administration of moderate sedation
- Provides orders for Moderate Sedation
- Management of the Moderate Sedation
- Provides orders for post-sedation care
- Post-sedation Assessment (completed and documented in a post-sedation note prior to discharge from the procedural area)

KMC, Policy # CP3-142

Role of the Competency Validated RN

- **Pre-procedure checklist** (NPO status, presence of the clinician's pre-sedation note, verification of appropriate transportation if the patient to be discharged home)
- **The immediate pre-sedation patient evaluation**
- **Administer and document the moderate sedation medications ordered per the clinician with applicable dose and timing.**
- **Monitor the patient** throughout the sedation *
- **Remains with the patient until care is transferred to an RN** responsible for post-procedure care

*** The Moderate sedation RN will not engage in any tasks that would compromise CONTINUOUS patient monitoring**

KMC, Policy # CP3-142

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MODERATE SEDATION:

INTRA-PROCEDURE MONITORING

Intra-Procedural Monitoring

Performed and documented by the Moderate Sedation RN:

- Cardiac Rhythm
- Blood Pressure, heart rate, respiratory rate and oxygen saturation (SpO_2) q 5 minutes
- ETCO2 q5 minutes (when available)
- RASS score on regular basis and 5 minutes after each opioid/sedative dose administered
- Medication given with dose and timing

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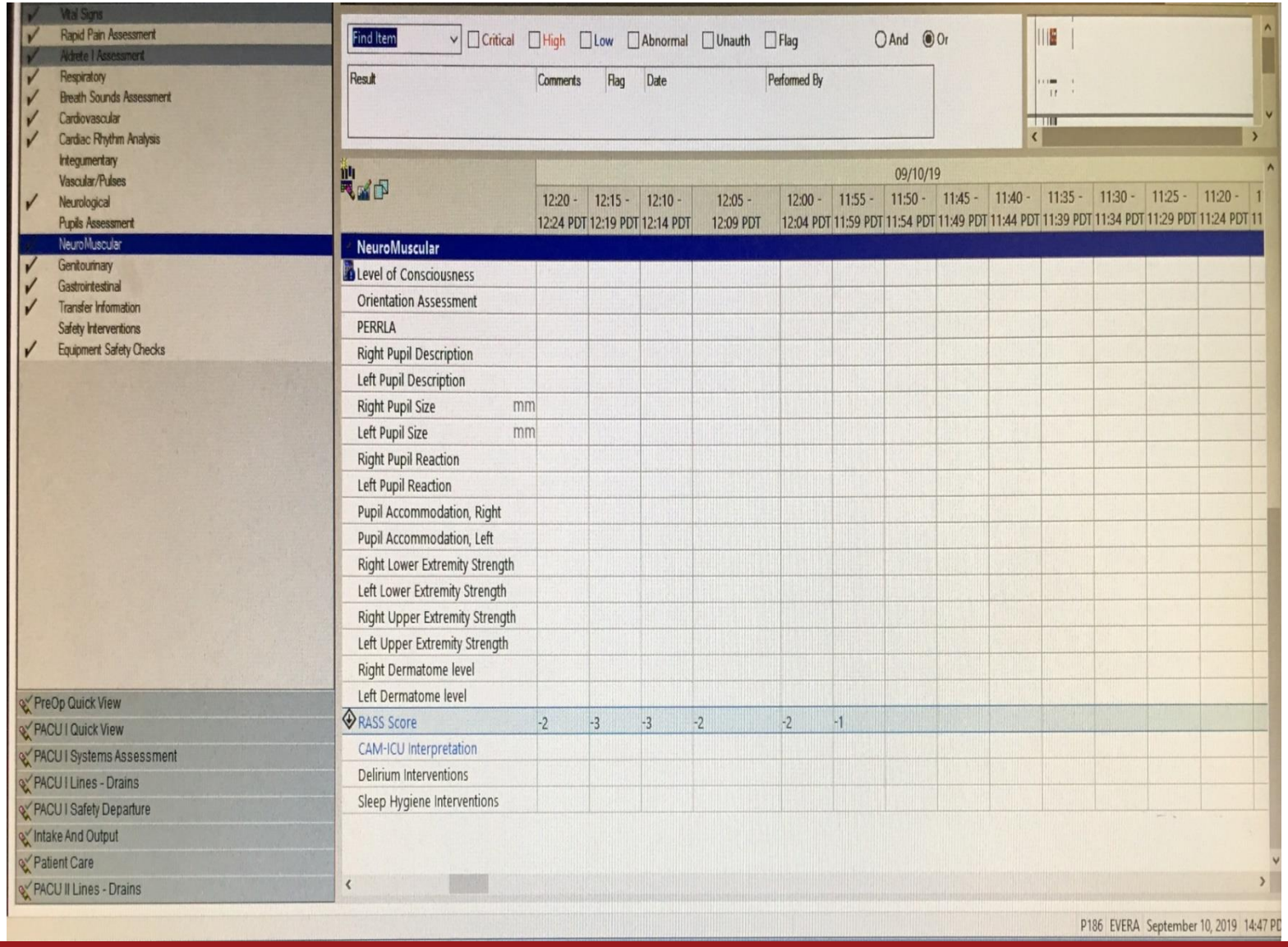
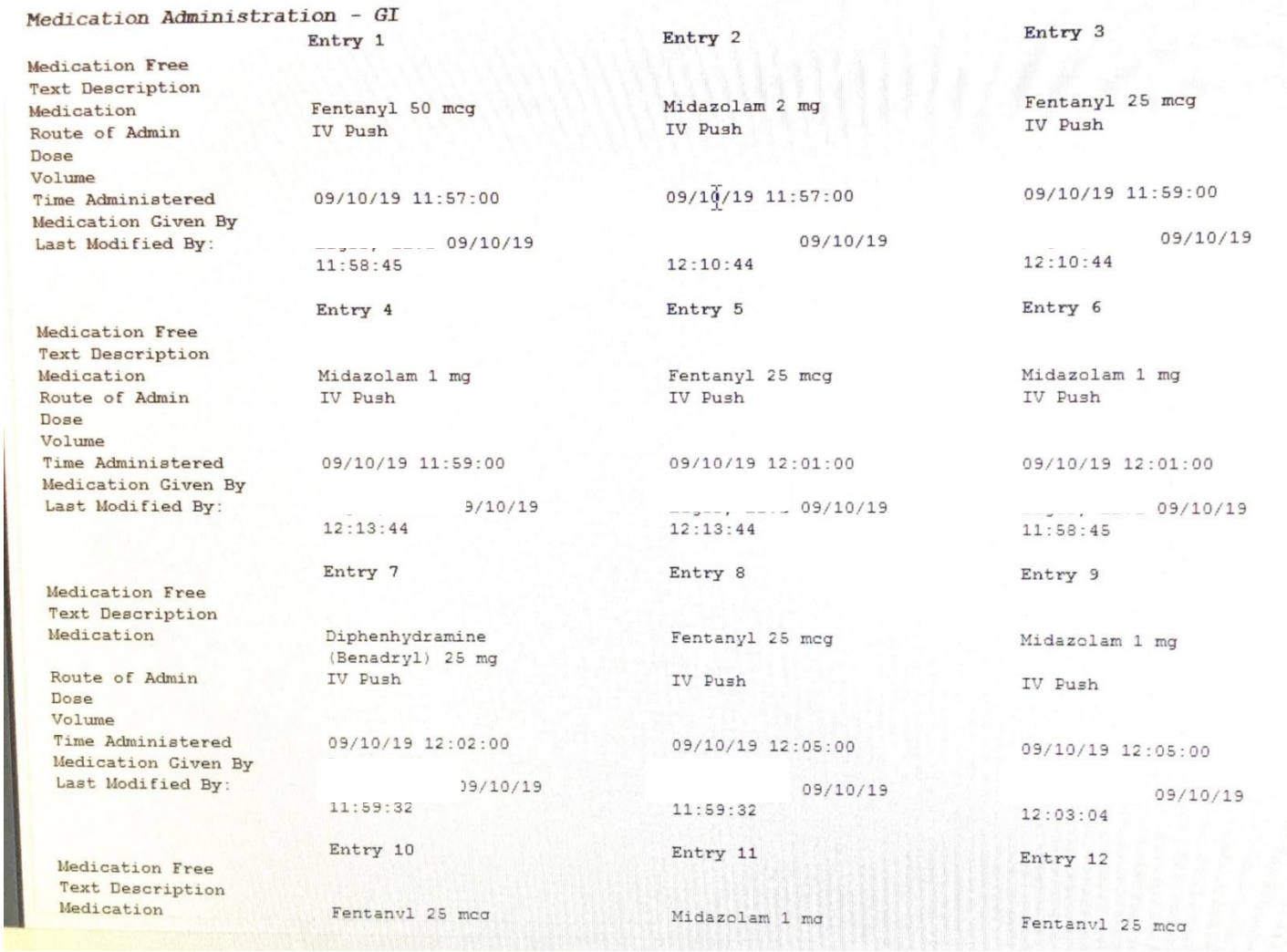
Intra-Procedural Monitoring Sample



Intra-Procedural Monitoring Sample



Medication Administration - GI

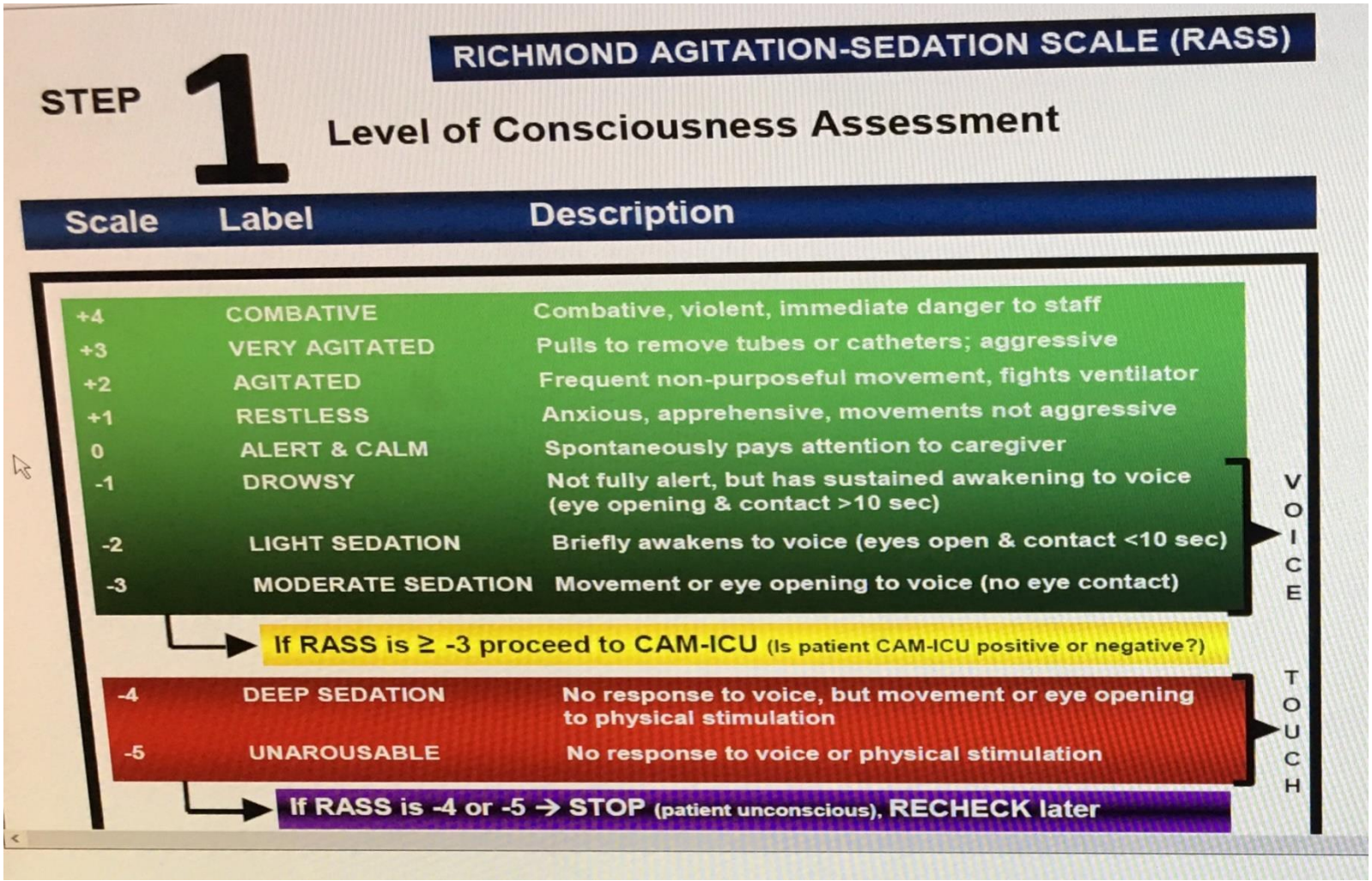
	Entry 1	Entry 2	Entry 3
Medication Free Text Description			
Medication	Fentanyl 50 mcg	Midazolam 2 mg	Fentanyl 25 mcg
Route of Admin	IV Push	IV Push	IV Push
Dose			
Volume			
Time Administered	09/10/19 11:57:00	09/10/19 11:57:00	09/10/19 11:59:00
Medication Given By			
Last Modified By:	[redacted] 09/10/19 11:58:45	09/10/19 12:10:44	09/10/19 12:10:44

	Entry 4	Entry 5	Entry 6
Medication Free Text Description			
Medication	Midazolam 1 mg	Fentanyl 25 mcg	Midazolam 1 mg
Route of Admin	IV Push	IV Push	IV Push
Dose			
Volume			
Time Administered	09/10/19 11:59:00	09/10/19 12:01:00	09/10/19 12:01:00
Medication Given By			
Last Modified By:	[redacted] 9/10/19 12:13:44	[redacted] 09/10/19 12:13:44	[redacted] 09/10/19 11:58:45

	Entry 7	Entry 8	Entry 9
Medication Free Text Description			
Medication	Diphenhydramine (Benadryl) 25 mg	Fentanyl 25 mcg	Midazolam 1 mg
Route of Admin	IV Push	IV Push	IV Push
Dose			
Volume			
Time Administered	09/10/19 12:02:00	09/10/19 12:05:00	09/10/19 12:05:00
Medication Given By			
Last Modified By:	[redacted] 09/10/19 11:59:32	09/10/19 11:59:32	09/10/19 12:03:04

	Entry 10	Entry 11	Entry 12
Medication Free Text Description			
Medication	Fentanyl 25 mcg	Midazolam 1 mg	Fentanyl 25 mcg

RASS Scale


RICHMOND AGITATION-SEDATION SCALE (RASS)
STEP 1
Level of Consciousness Assessment
Scale
Label
Description
+4 COMBATIVE Combative, violent, immediate danger to staff
+3 VERY AGITATED Pulls to remove tubes or catheters; aggressive
+2 AGITATED Frequent non-purposeful movement, fights ventilator
+1 RESTLESS Anxious, apprehensive, movements not aggressive
0 ALERT & CALM Spontaneously pays attention to caregiver
-1 DROWSY Not fully alert, but has sustained awakening to voice (eye opening & contact >10 sec)
-2 LIGHT SEDATION Briefly awakens to voice (eyes open & contact <10 sec)
-3 MODERATE SEDATION Movement or eye opening to voice (no eye contact)
VOICE
If RASS is ≥ -3 proceed to CAM-ICU (Is patient CAM-ICU positive or negative?)
-4 DEEP SEDATION No response to voice, but movement or eye opening to physical stimulation
-5 UNAROUSABLE No response to voice or physical stimulation
TOUCH
If RASS is -4 or -5 → STOP (patient unconscious), RECHECK later

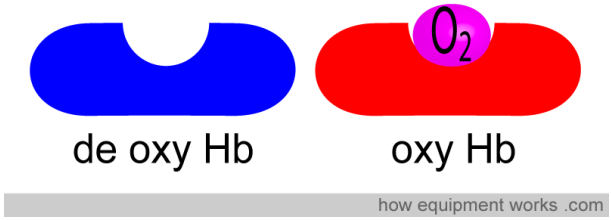
Monitoring

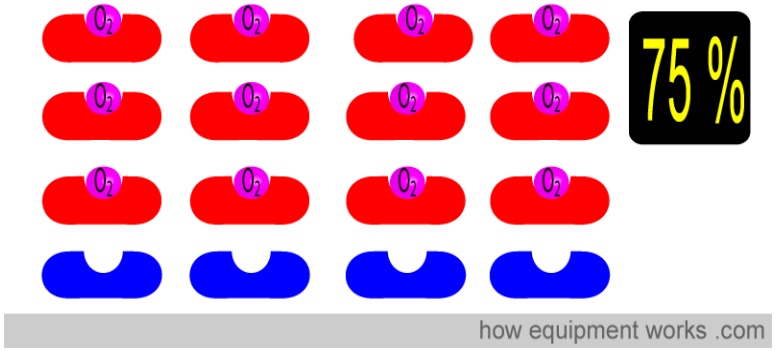
- Monitoring of the patient is to be continuous throughout the procedure
- Oxygenation, ventilation, hemodynamics and level of sedation should be monitored
- Documentation of blood pressure, heart rate and rhythm, respiratory rate, oxygen saturation, capnography should be at a minimum every 5 minutes
- Alarms should be on at all times

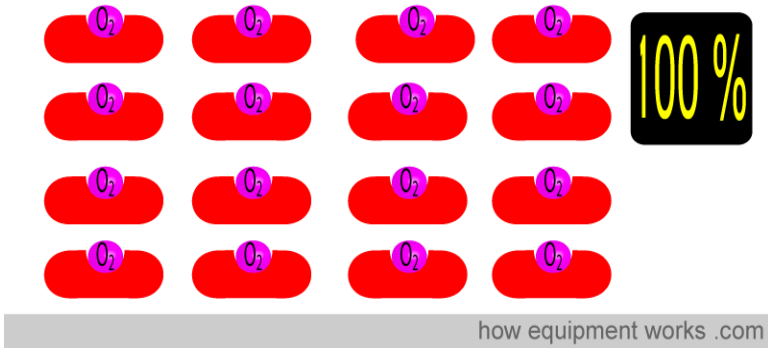
Pulse Oximetry

- ****The most important monitor****

- Pulse oximetry measures the percentage of oxygen saturation of hemoglobin in the arterial blood







Advantages of Pulse Oximetry

- Continuous monitoring
- Multiple sites
- Noninvasive
- Calibration not required
- User-friendly
- Multiple parameters measured: Sp02, perfusion, heart rate and rhythm

Sources of Error of Pulse Oximetry

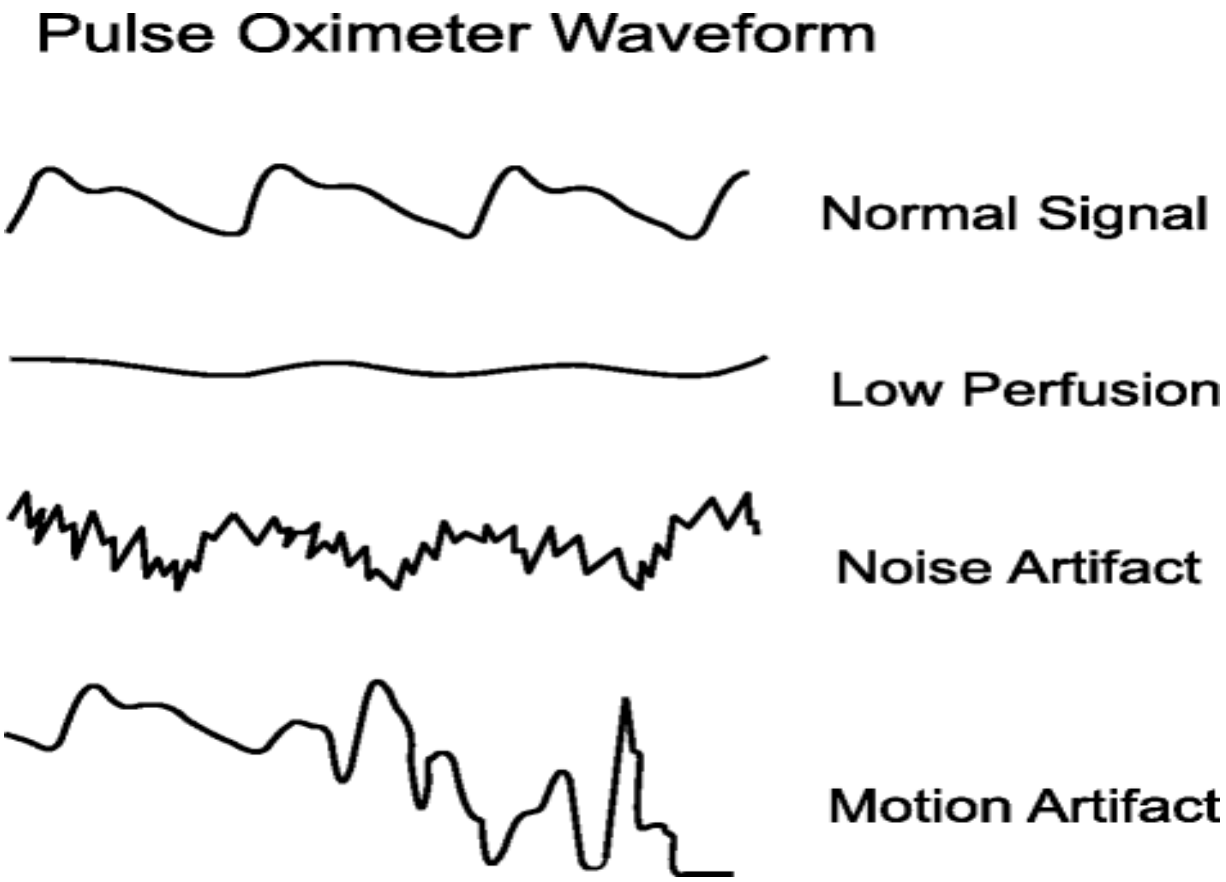
- **Slippage of the sensor**: always check the position of the sensor
- **Movement and shivering**
- **Low perfusion**: cold extremities, severe vasoconstriction, compartment syndrome, hypotension, severe hypovolemia
- **Dyes**: methylene blue, indigo carmine and indocyanine green
- **Anemia**: Hg < 5 may create a false decrease in Sp02 reading
- **Hypoxemia**: Sa02 < 70% may cause inaccurate readings.
- **Nail polish**: especially blue, red or green nail polish
- **Dyshemoglobinemias:** methemoglobin and carboxyhemoglobin
- **Rapid or erratic heart rates**

Pulse Oximetry Waveform Variations

Note: If there is not a good waveform, the pulse Ox has low validity.

A good waveform will help ensure accuracy.

Note that at times the pulse ox may not be on the finger and might still display a number but there will not be a normal signal wave form



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MODERATE SEDATION:

MEDICATIONS & REVERSAL AGENTS

Medications and Dosing Guideline for Moderate Sedation

	Property	Average Dose	Incremental Dose	Onset	Duration	Max Dose
Fentanyl	Analgesic	25-150 mcg	25-50 mcg	1-5 min	30-60 min	250 mcg/hr
Midazolam	Anxiolytic, amnestic, sedative	1-5 mg	0.5-1 mg	3-5 min	30-120 min	6 mg/hr
Flumazenil	Reversal agent for Midazolam	1 mg	0.2 mg	1-2 min	40-180 min	1 mg/hr
Naloxone	Reversal agent for Fentanyl	0.4 mg	0.2 mg	1-2 min	30-180 min	10 mg/hr

KMC, Policy # CP3-142

Reversal of Sedation and or Analgesia

- Administer **flumazenil** to reverse benzodiazepine-induced sedation and respiratory depression
- Administer **naloxone** to reverse opioid-induced sedation and respiratory depression
- After pharmacologic reversal, observe and monitor patients for **2 hours** to ensure that sedation and cardiorespiratory depression does not recur once the effect of the antagonist dissipates

Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018. A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology, Anesthesiology 2018; 128:437-79

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MODERATE SEDATIONS:

COMPLICATIONS

Complications of Moderate Sedation

1. Hypoxemia
2. Hypoxemia
3. Hypoxemia
4. Hypoxemia
5. Hypoxemia
6. Hypoxemia

Hypoxemia

PaO2 is less than 60 mmHg or SpO2 less than 90%

Clinical picture:

1. Agitation
2. Cyanosis

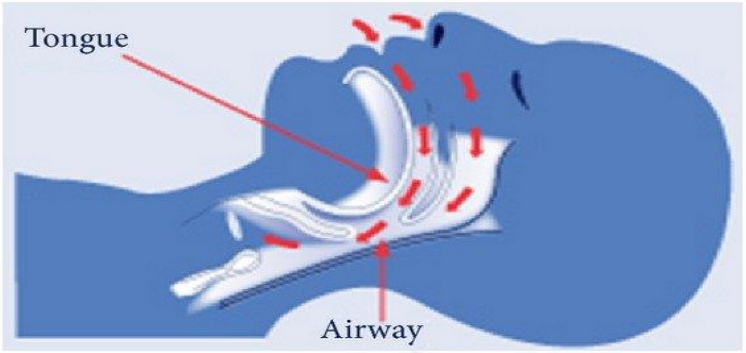
Causes of Hypoxemia:

1. Airway obstruction
2. Hypoventilation
3. Low inspired oxygen
4. Increased oxygen consumption (e.g. shivering, sepsis, pain)

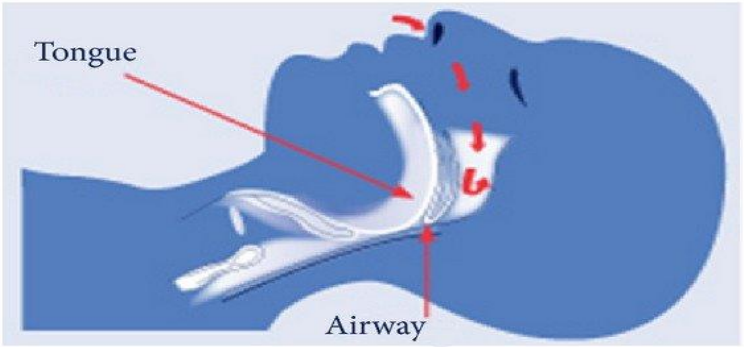
Airway Obstruction

This is the most common complication of Moderate Sedation

Check for airway obstruction immediately when hypoxemia occurs followed by differential investigation for reason(s) for hypoxemia as necessary.



(a)



(b)

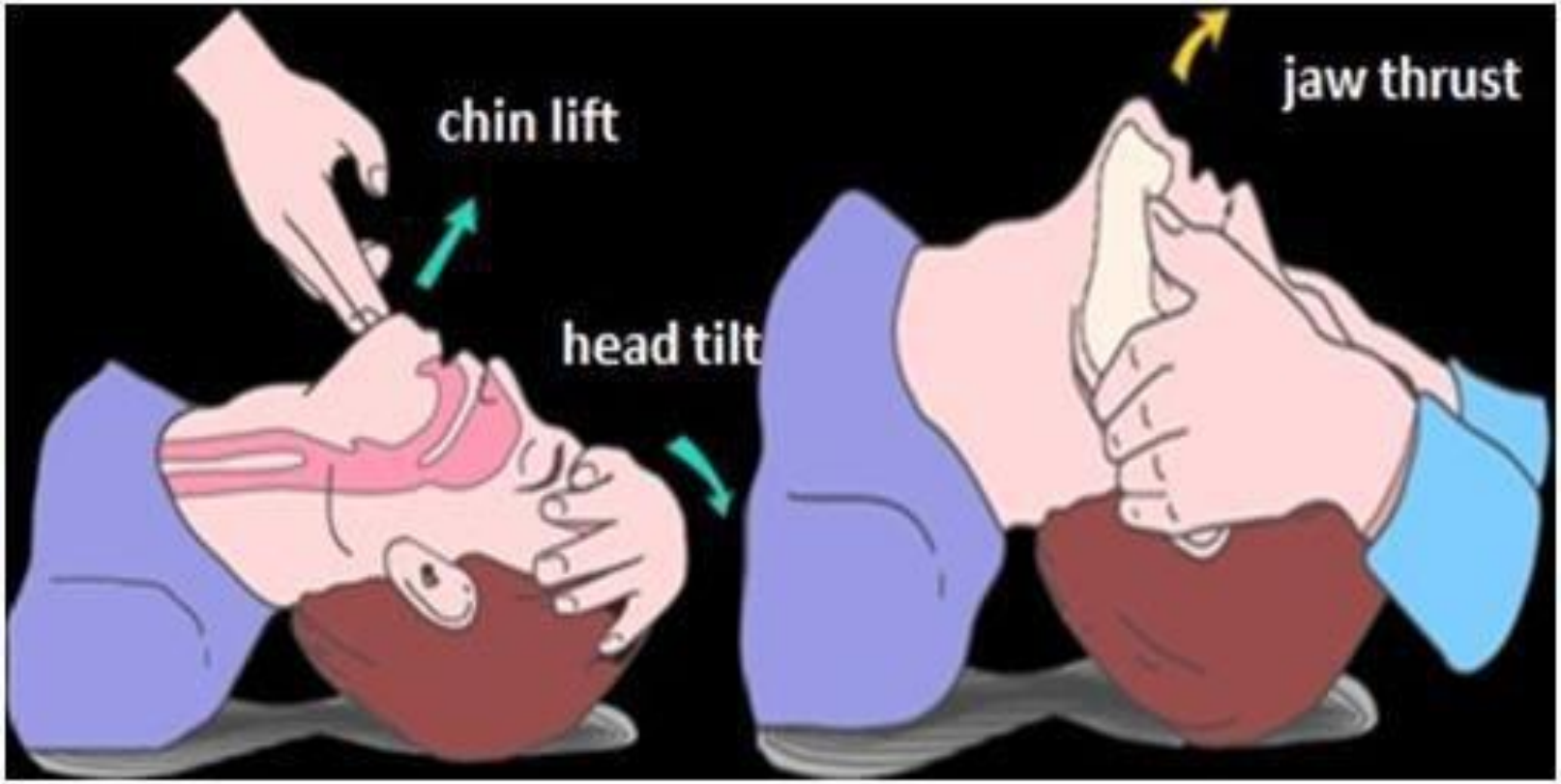
Stepwise Management of Airway Obstruction

1. Chin lift and head tilt
2. Jaw Thrust
3. Oropharyngeal Airway placement
4. Nasopharyngeal Airway placement
5. Laryngeal Mask Airway (LMA) placement
6. Endotracheal intubation

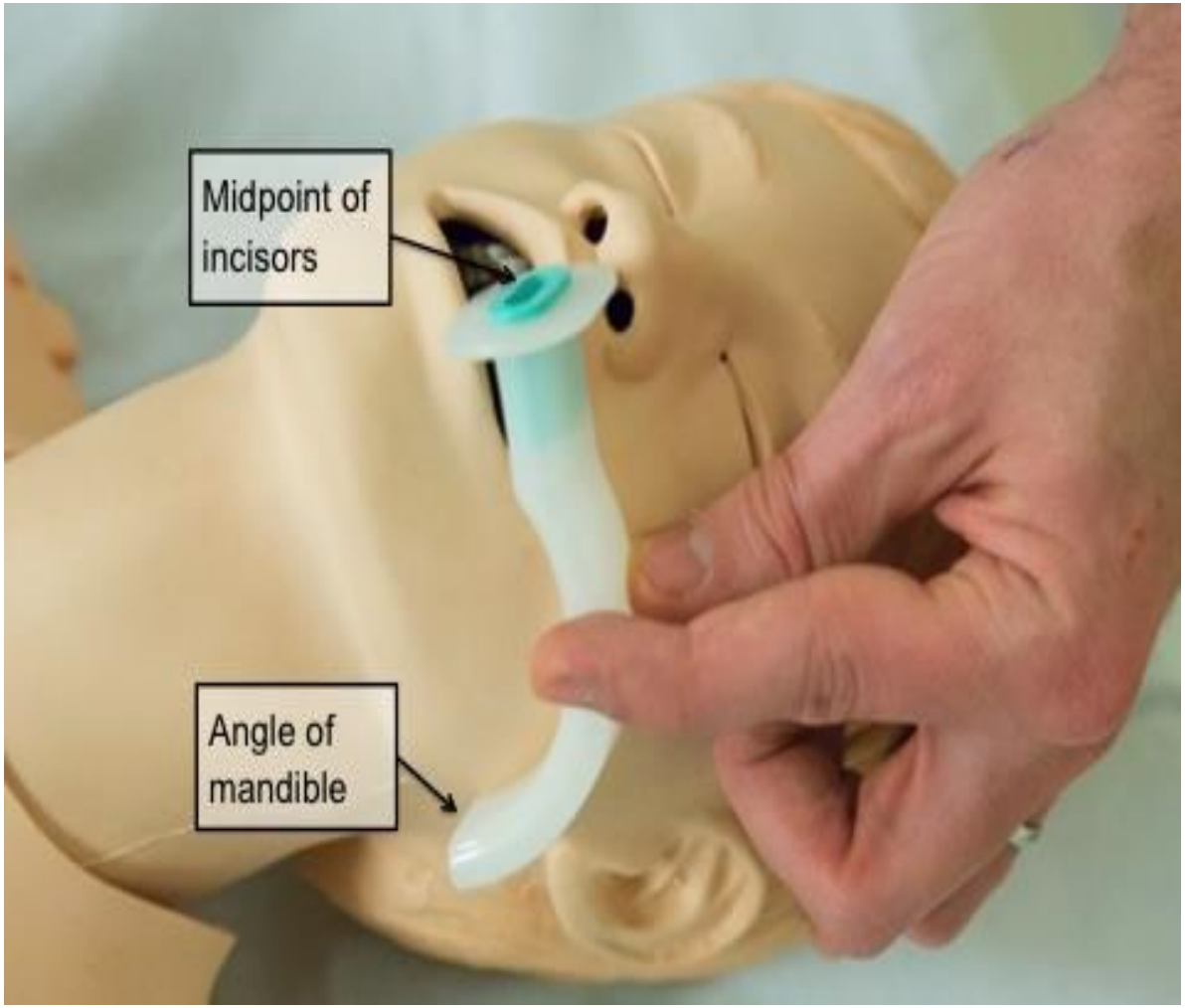
Signs of Airway Obstruction

1. Inspiratory stridor or snoring
2. Sternal retraction
3. Rocking chest movements
4. Absence of breath sounds
5. Hypoxemia (drop in oxygen saturation)
6. Hypercapnia (increased ET CO_2)

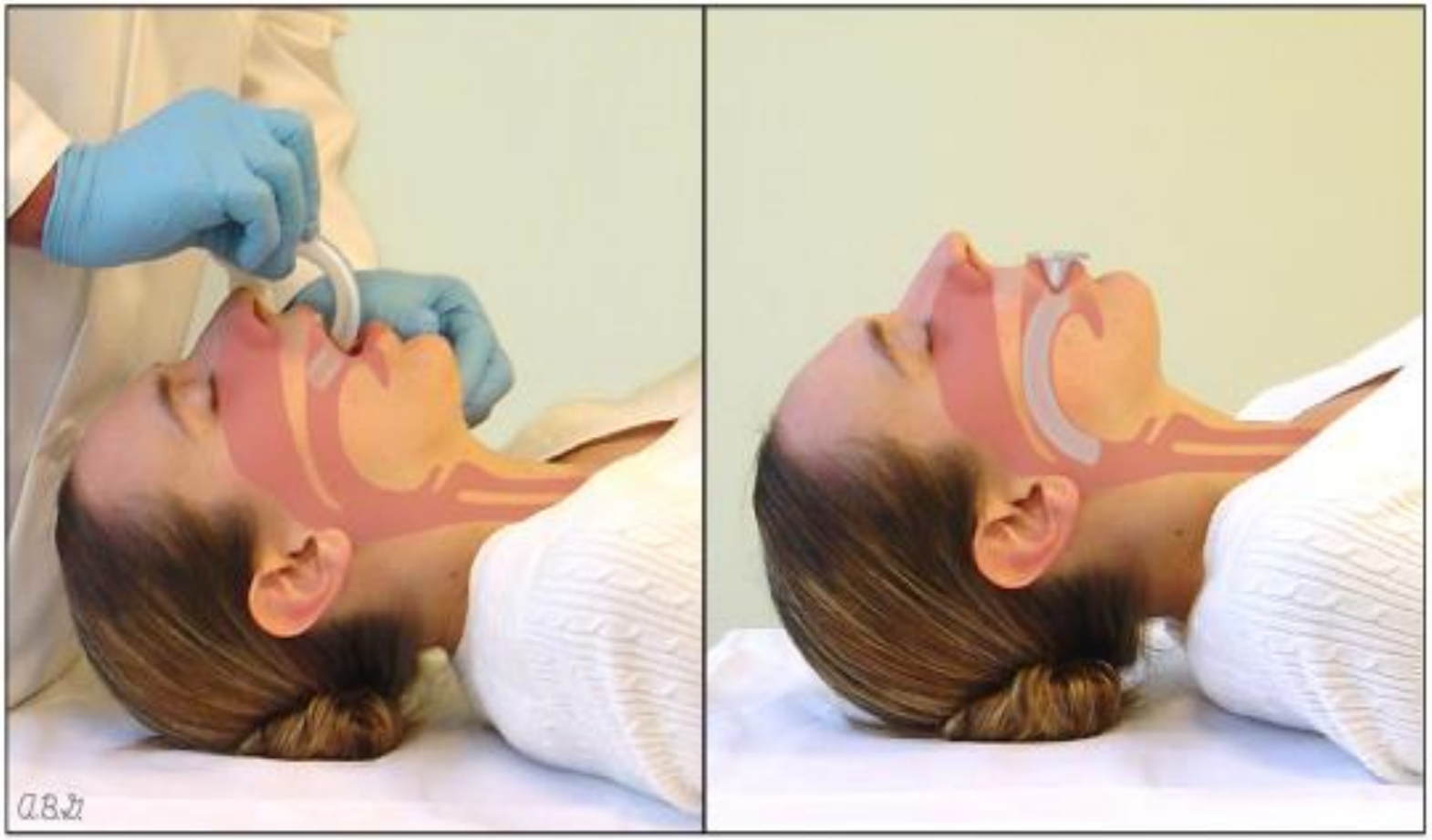
Management of Airway Obstruction



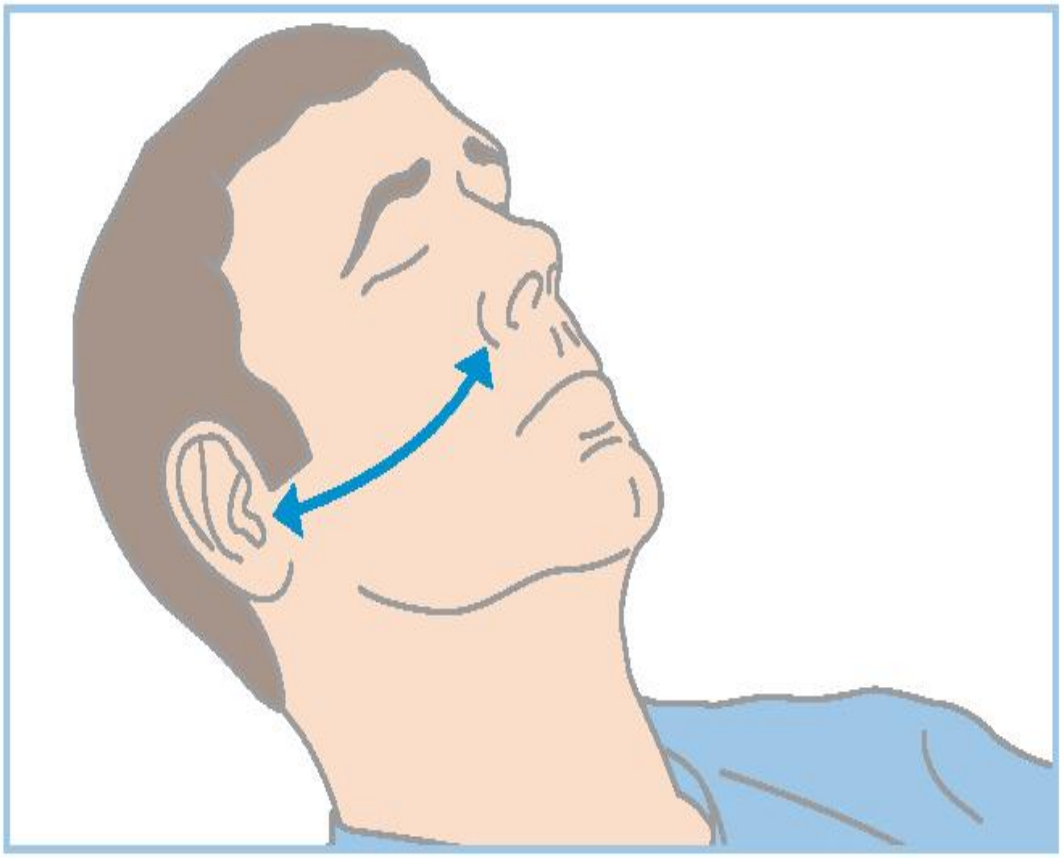
Oral Airway; Choosing the Right Size



Oral Airway Placement

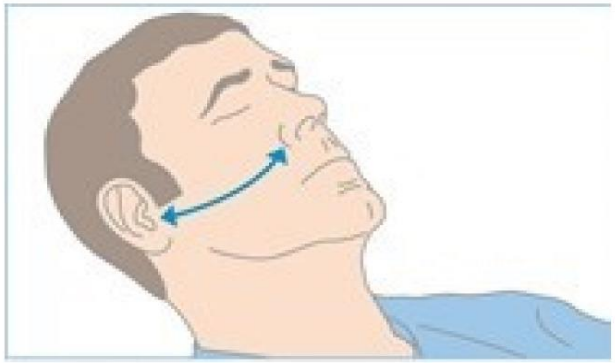


Nasal Airway; Choosing the right size

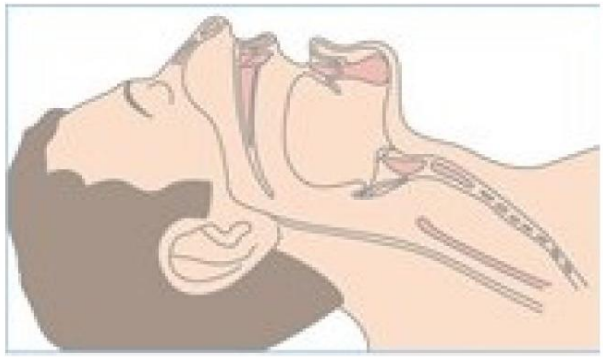


Nasal Airway; How to Insert

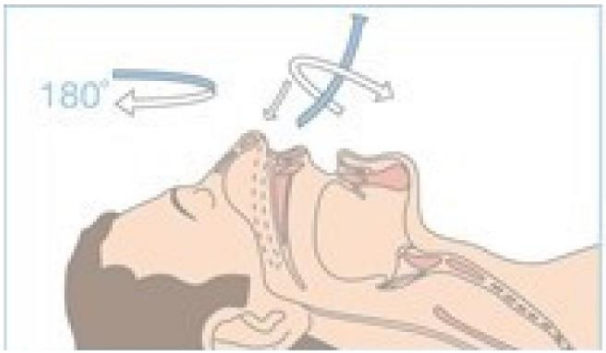
How to insert Nasopharyngeal Airway



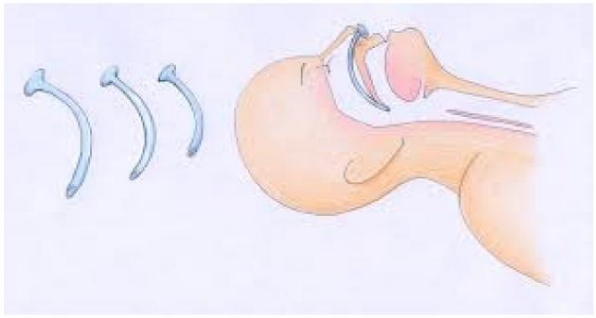
The length of the nasal airway can be estimated by the distance from the patients nostril to the earlobe.



The nasal airway is best inserted when the patient is in the supine position. The airway should be lubricated with a water soluble fabricant prior to insertion.

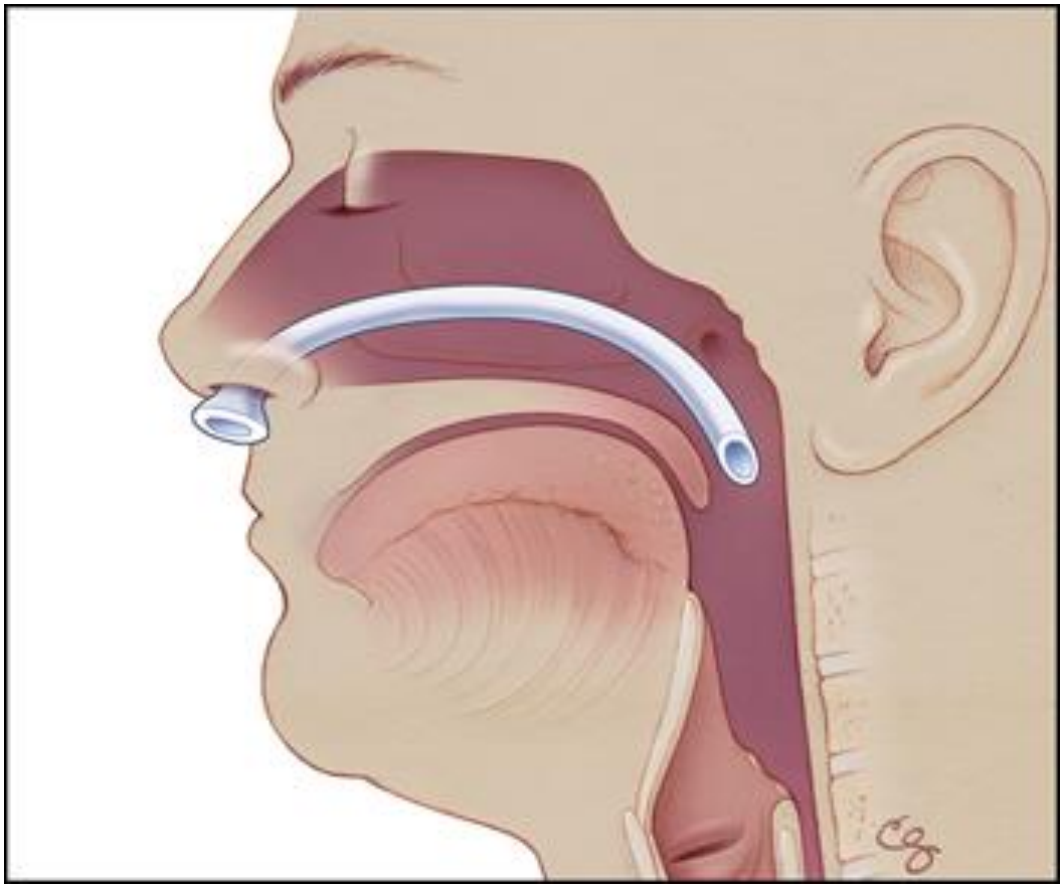


Insert with the curve facing the opposite direction and follow the nasal passage whilst turning the nasopharyngeal airway through 180 o



This is how the nasopharyngeal will look like once its been placed inside the nasal.

Nasal Airway Appearance after Insertion

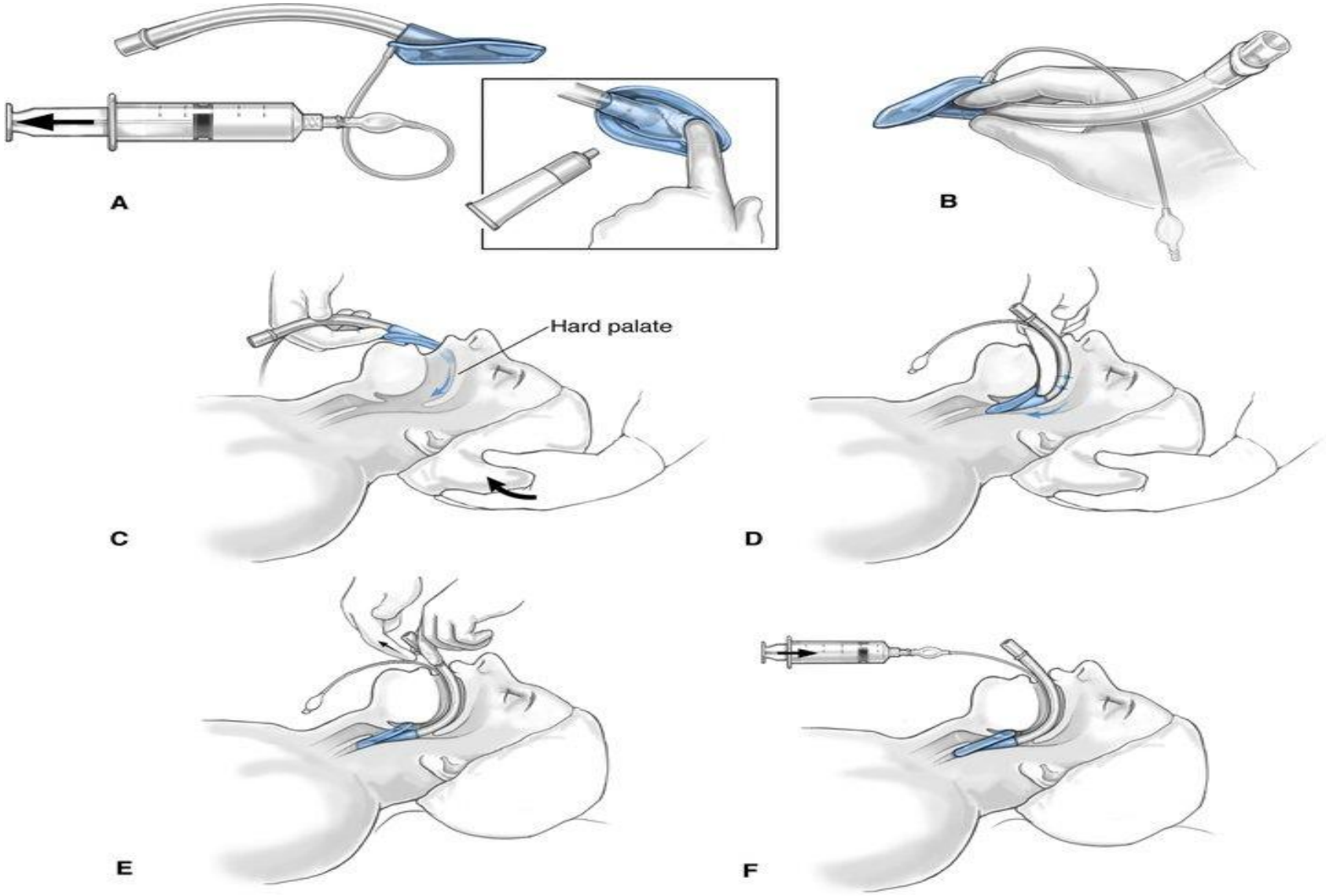


Laryngeal Mask Airway (LMA)

LMA Unique

LMA Supreme

LMA Unique Insertion Technique



LMA Supreme Insertion Technique

LMA Supreme™ Insertion Technique

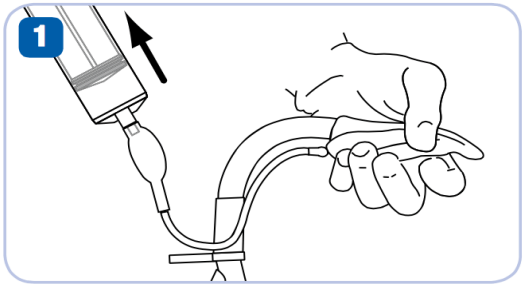


Figure 1: Fully deflate the mask for insertion. Attach a syringe. Compress the distal tip of the mask with thumb and index finger. Apply slight tension to the inflation line while removing all air until a vacuum is felt. Disconnect the syringe.

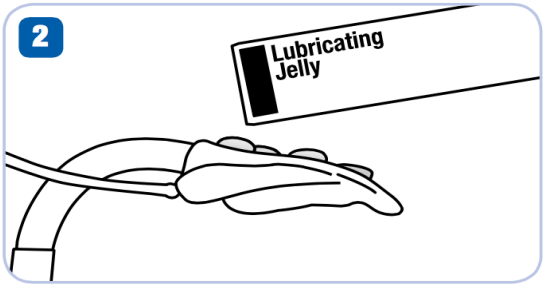


Figure 2: Generously lubricate the posterior surface of the cuff and airway tube.

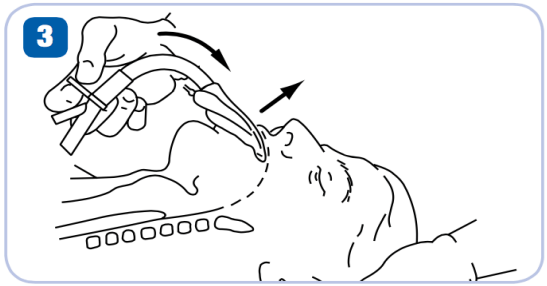


Figure 3: Place the patient's head in a neutral or slight "sniffing" position. Hold the LMA Supreme™ at the proximal end with the connector pointing downward to the chest and the tip of the distal end pointing toward the palate.

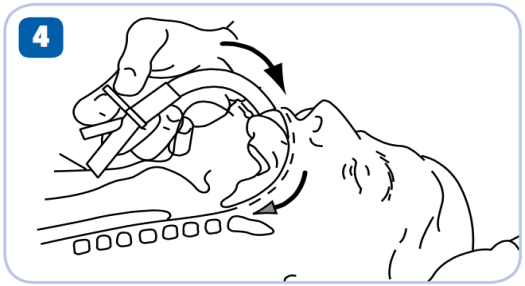


Figure 4: Press the tip of the mask against the hard palate. Maintaining pressure against the palate, continue to rotate the mask inwards in a circular motion following the curvature of the hard and soft palate.

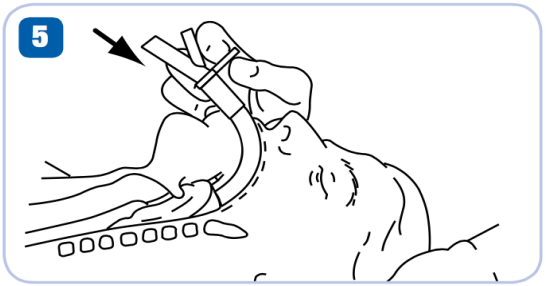


Figure 5: Continue until resistance is felt. The distal end of the mask should now be in contact with the upper esophageal sphincter. The device is now fully inserted.

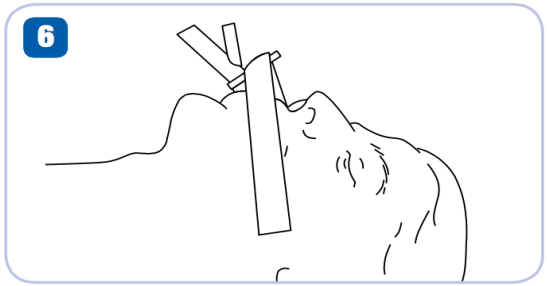
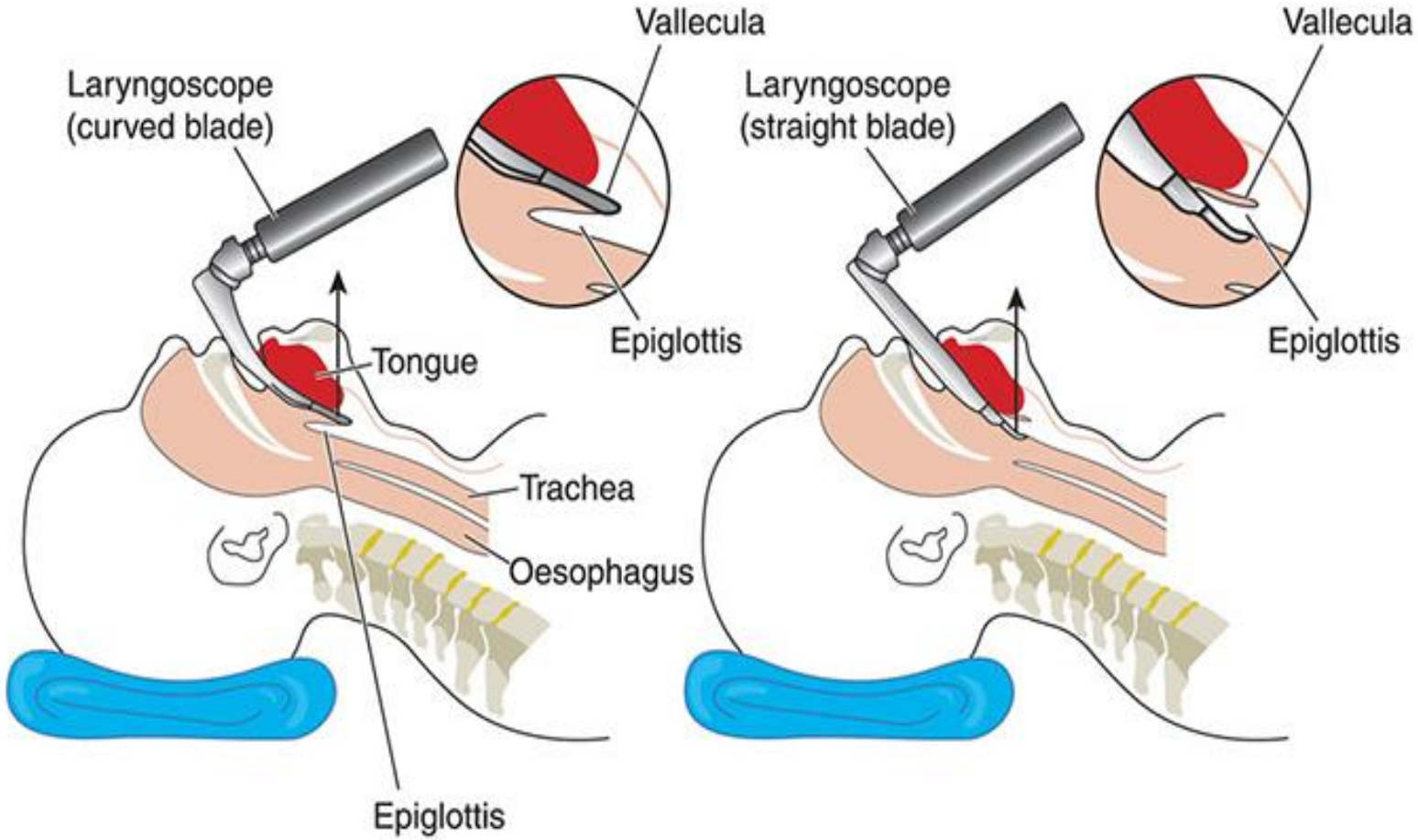
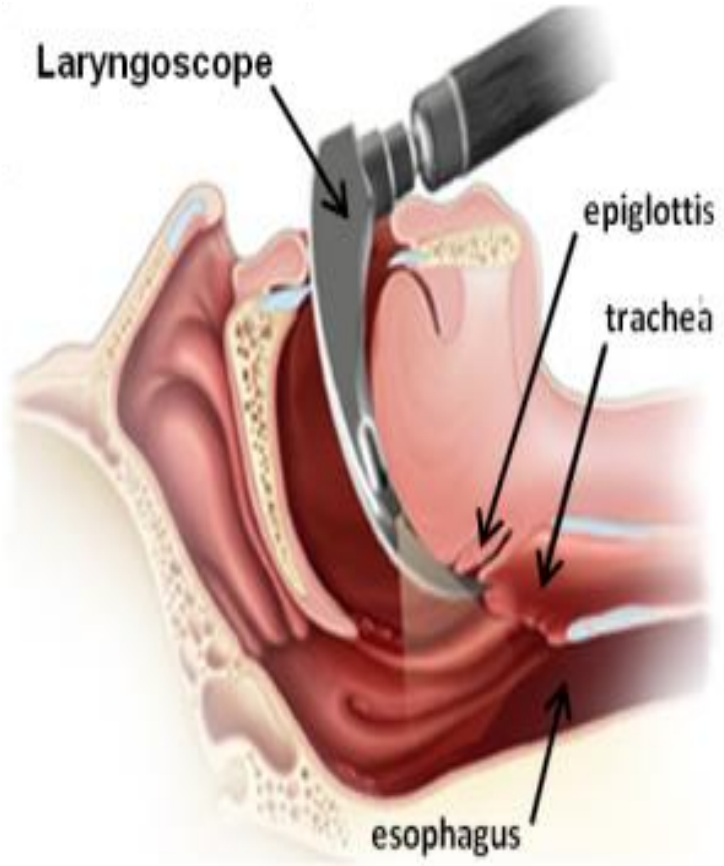


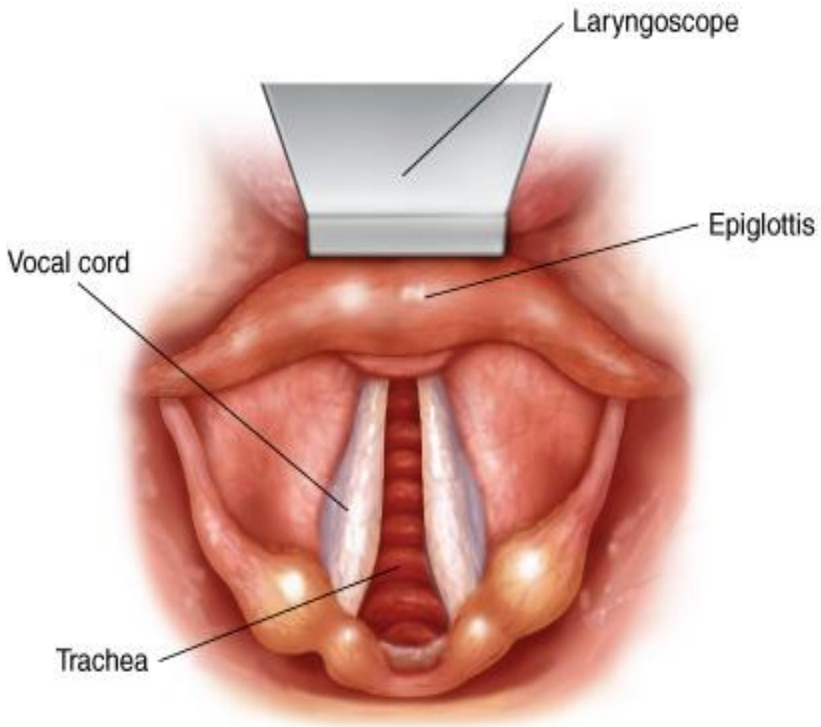
Figure 6*: Maintaining inward pressure, secure the mask into position by taping cheek to cheek across the fixation tab. This should be done prior to inflation. Inflate with the minimum amount of air needed to achieve an effective seal. The recommended intracuff pressure should not exceed 60 cm H_2O.

Endotracheal Intubation



Endotracheal Intubation





Source: Hanson CW III: *Procedures in Critical Care*: http://www.accessmedicine.com

Treatment of Airway/ Respiratory compromise

1. Encourage or physically stimulate patients to breathe deeply
2. Administer supplemental oxygen
3. Maintain the airway patency using Jaw Thrust and or an oral/ nasal airway
4. Provide positive pressure ventilation if spontaneous ventilation is inadequate
5. Use reversal agents in cases where airway control, spontaneous ventilation or positive pressure ventilation are inadequate

Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018. A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology, Anesthesiology 2018; 128:437-79

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MODERATE SEDATION:

POST-PROCEDURE

Post-Sedation Care

- Post-sedation Evaluation by the Moderate Sedation clinician
- Post-sedation recovery by a post-sedation qualified nurse

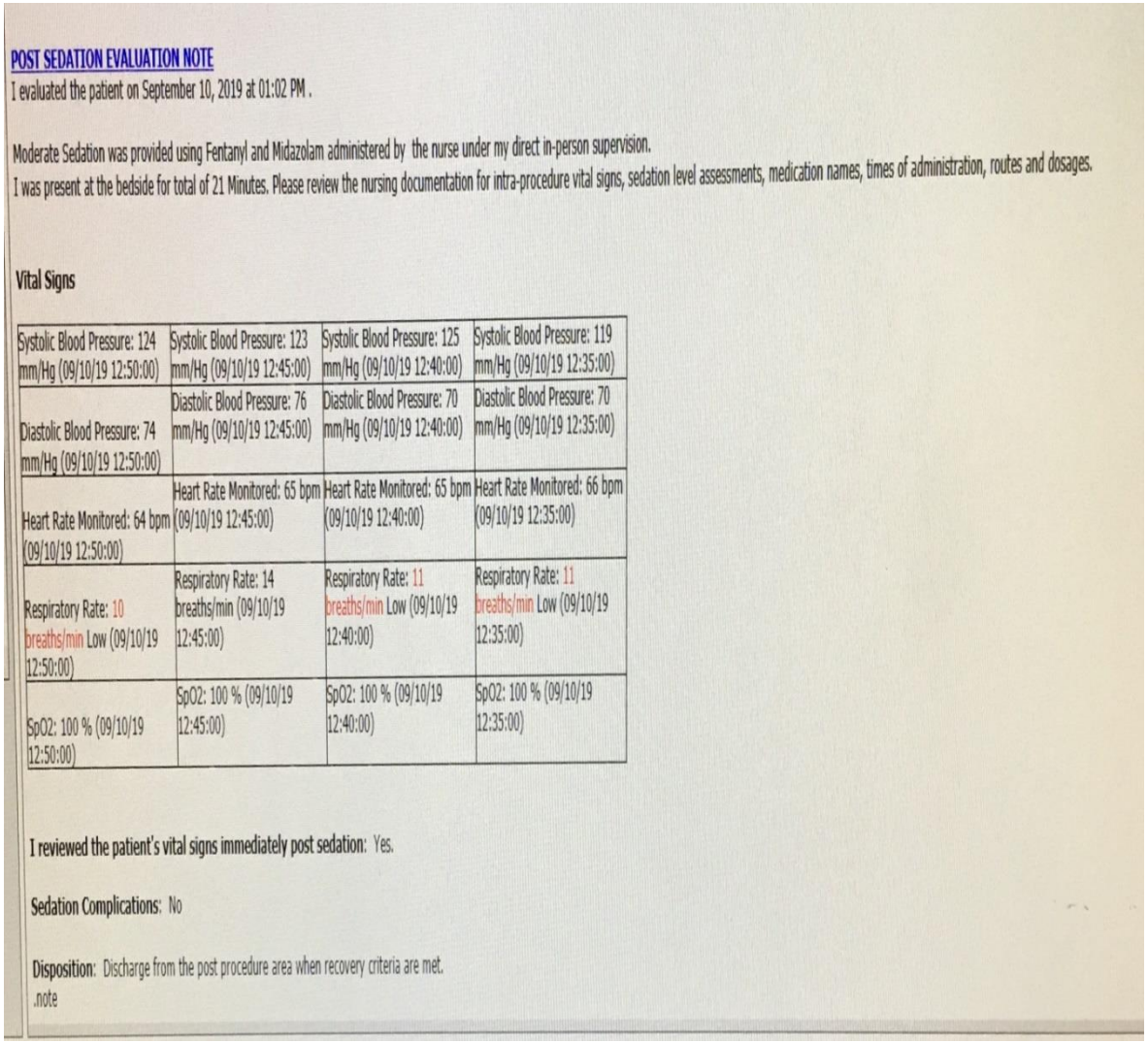
Post Sedation Evaluation

A **sedation-credentialed clinician** will perform and document a **post- sedation evaluation** prior to the patient's discharge from the post- procedure recovery area

KMC, Policy # CP3-142

Components of the Post-Sedation Evaluation Note

1. Review of Post sedation vital signs
2. Review of Sedation complication(s)
3. Disposition plan



POST SEDATION EVALUATION NOTE

I evaluated the patient on September 10, 2019 at 01:02 PM .

Moderate Sedation was provided using Fentanyl and Midazolam administered by the nurse under my direct in-person supervision.
I was present at the bedside for total of 21 Minutes. Please review the nursing documentation for intra-procedure vital signs, sedation level assessments, medication names, times of administration, routes and dosages.

Vital Signs

Systolic Blood Pressure: 124 mm/Hg (09/10/19 12:50:00)	Systolic Blood Pressure: 123 mm/Hg (09/10/19 12:45:00)	Systolic Blood Pressure: 125 mm/Hg (09/10/19 12:40:00)	Systolic Blood Pressure: 119 mm/Hg (09/10/19 12:35:00)
Diastolic Blood Pressure: 74 mm/Hg (09/10/19 12:50:00)	Diastolic Blood Pressure: 76 mm/Hg (09/10/19 12:45:00)	Diastolic Blood Pressure: 70 mm/Hg (09/10/19 12:40:00)	Diastolic Blood Pressure: 70 mm/Hg (09/10/19 12:35:00)
Heart Rate Monitored: 64 bpm (09/10/19 12:50:00)	Heart Rate Monitored: 65 bpm (09/10/19 12:45:00)	Heart Rate Monitored: 65 bpm (09/10/19 12:40:00)	Heart Rate Monitored: 66 bpm (09/10/19 12:35:00)
Respiratory Rate: 10 breaths/min Low (09/10/19 12:50:00)	Respiratory Rate: 14 breaths/min (09/10/19 12:45:00)	Respiratory Rate: 11 breaths/min Low (09/10/19 12:40:00)	Respiratory Rate: 11 breaths/min Low (09/10/19 12:35:00)
SpO2: 100 % (09/10/19 12:50:00)	SpO2: 100 % (09/10/19 12:45:00)	SpO2: 100 % (09/10/19 12:40:00)	SpO2: 100 % (09/10/19 12:35:00)

I reviewed the patient's vital signs immediately post sedation: Yes.

Sedation Complications: No

Disposition: Discharge from the post procedure area when recovery criteria are met.
.note

KMC, Policy # CP3-142

Post Sedation Recovery

- An RN will continuously monitor and document the vital signs, cardiac rhythm, pain score and sedation score q15 min for 30 min or until phase I discharge criteria are met

- The RN will document the following prior to discharge:
  - Modified Aldrete Score
  - Cardiac rhythm strip
  - Total medication administered
  - O2 supplementation

- If a reversal agent was administered, an extended post-procedure observation should be considered

KMC, Policy # CP3-142

Minimum Frequency and Duration of Post-Sedation Vital Signs Monitoring

Patient Population	Frequency	Duration
All patients	q 15 min	**30 min** after the last dose of sedative/opioid and until discharge criteria phase 1 met
Patients who received reversal agents	q 15 min	**2 hrs** or until discharge criteria phase 1 met

KMC, Policy # CP3-142

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MODERATE SEDATION:

PHASES OF RECOVERY

Phases of Recovery

- Phases of Recovery refer to levels of care and **not physical places**

- *Patient may progress from one phase (level of care) to another even if she/he stays in the same location*

- 3 Phases:
    1. Phase I
    2. Phase II
    3. Extended Care

KMC, Policy # CP3-142

Post Sedation Monitoring and Care

Phase I	**RN will continuously monitor and document heart rhythm, HR, RR, SpO2, RASS score and Rapid pain assessment q15 min for 30 min or until discharge criteria by phase I are met**
Phase II	The RN is focused on preparation for care in the home or an extended care environment
Extended Care	This phase is for patients who have met criteria to leave phase I or II but are unable to go to another place

KMC, Policy # CP3-142

Phase I Recovery

- **Basic life-sustaining needs are of the highest priority**
- Patient requires close monitoring including:
  - *Airway Patency*
  - *Oxygenation*
  - *Ventilation*
  - *Hemodynamics*
  - *Temperature*
  - *Pain*
  - *Nausea and vomit*
  - *Fluid status*
- When a patient has achieved these elements of care, she/he may progress to phase II level of care
- Phase II level of care can be in the same location as Phase I

ASPAN 2015; KMC, Policy # CP3-142

Discharge Criteria Phase I Recovery

- Modified Aldrete Score ≥ 9
- Temperature within normal range
- Adequate control of pain
- Adequate control of nausea and vomit
- Adequate fluid status

Modified Aldrete Score

Modified Aldrete's Score [5]

PARAMETER	SCORE
SATURATION	
• SpO_2 > 90% on room air	2
• SpO_2 >90% on oxygen	1
• SpO_2 <90% on oxygen	0
RESPIRATION	
• Breathes deeply and coughs freely	2
• Dyspnoeic, shallow or limited breathing	1
• Apnoea	0
CIRCULATION	
• Blood pressure ± 20 mm Hg of normal	2
• Blood pressure ± 20 – 50 mm Hg of normal	1
• Blood pressure more than ± 50 mm Hg of normal	0
CONSCIOUSNESS	
• Fully awake	2
• Arousable on calling	1
• Not responsive	0
ACTIVITY	
• Moves all extremities	2
• Moves two extremities	1
• Unable to move extremities	0

The total possible score is 10; patients scoring ≥ 9 are fit for discharge from phase 1 recovery

Phase II Recovery

- Can happen in the exact location of Phase I recovery
- Focused on preparing the patient to be discharged home or to regular nursing floor
- Assess ability to urinate, ambulate, dress, and eat in addition to Aldrete score, pain and nausea and vomiting
- **Patients who received sedation need a responsible adult to be discharged home**

Electronic Incident Reporting Requirements

Hospital personnel will complete an occurrence/SRM report for any of the following:

- Use of Reversal Agents
- All cases requiring assisted ventilation
- All unanticipated admissions to the hospital or transfers to a higher level of care
- All cases in which oxygen saturation is < 90% for 5 min or < 80% at any time
- All cases with new onset dysrhythmias (VT, VF, Afib and A flutter)

KMC, Policy # CP3-142

References and suggested reading

1. **Keck Hospital of USC, USC Norris Cancer Hospital Moderate sedation policy** # CP 3-142, Revised date 07/16/2019
2. **Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018**. A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology, **Anesthesiology 2018**; 128:437-79
3. **The Joint Commission, Comprehensive Accreditation Manual for Hospitals, Chicago, IL PC** 03.01.01 - 03.01.07
4. **Michael E Detsky, Naheed Jivraj, Neill K Adhikari et al (2019) Will This Patient Be Difficult to Intubate?: The Rational Clinical Examination Systematic Review. JAMA. 2019** Feb 5;321(5):493-503.
5. **Miller's Anesthesia**, 8th edition, December 2015
6. **Hagberg and Benumof's Airway Management**, 4th edition, 2018
7. **Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures 2017,** An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration, **Anesthesiology 2017**; 126:376-93
8. Basavana Goudra, M.D, Chewing gum while fasting before surgery is safe, ANESTHESIOLOGY™ 2014 annual meeting
9. Coffee, Cigarettes, Chewing Gum - Myths and Facts About Preoperative Fasting, Anasthesiol Intensivmed Notfallmed Schmerzther. 2019 Feb;54(2):142-145. doi: 10.1055/s-0043-124943. Epub 2019 Feb 15
10. AARC GUIDELINE: OXYGEN THERAPY FOR ADULTS IN THE ACUTE CARE FACILITY, **— 2002 Revision & Update**