Oral Assessment and Care in the Hospital Intensive Care Unit

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Excellent nursing care involves continual assessment of the patient, and the application of proper nursing skills. Oral assessment and oral prophylaxis are parts of total patient care, and are necessary on a frequent basis in order for the patient to progress toward a state of wellness.

This paper will guide the intensive care unit nurse in learning:
1. Why frequent oral assessment and oral prophylaxis are necessary.
2. How to assess the oral cavity for debris and pathogens.
3. What products to select for thorough oral prophylaxis.
4. How to safely perform a prompt and thorough oral assessment and oral prophylaxis.

Discussion will also include some common problems and avoidance of problems that can occur. There is also exciting new research of bacterial biofilm dispersion molecules, which will greatly aid with patient care in the near future.

Oral assessment and care (OAC) are essential for improvement of overall health and the Intensive Care Unit (ICU) patient’s progression toward recovery and wellness. Without OAC the patient can experience serious diseases which can lead to prolongation of ICU stay, increased morbidity, significantly increased costs of care, and possible mortality.\(^1,2,3,4\)

There are many factors that may preclude the ICU nurse from performing necessary OAC.\(^3,5,6,7\) Table 1.

(Table 1) Possible Factors that Preclude OAC in ICU Patients

1. Fear of dislodging the endotracheal tube
2. Fear of choking the patient or causing the patient to cough.
3. Fear of causing the patients additional discomfort.
4. Fear of dislodging the endotracheal tube.
5. Unpleasantness of the procedure for the patient and the nurse.
6. Time constraints.
7. Lack of knowledge of proper oral assessment for the ICU patient.
8. Lack of knowledge as to the importance of OAC for the attainment of wellness and recovery of the ICU patient.
9. Lack of knowledge of the most easy to use and proven armamentaria for effective OAC.
10. Lack of knowledge of the proper techniques to easily, quickly, and thoroughly cleanse the oral mucosa and hard tissues.
11. Lack of knowledge of when to request dentist or physician interventions for nurse-assessed concerns.
12. Lack of knowledge as to which oral hygiene techniques and oral hygiene products can have little effect or could prove to be harmful to the ICU patient.

The oral cavity contains a densely populated and a broad host of bacteria, viruses, and fungi, even in health.\textsuperscript{8,9} (Table 2) If left unchecked, these potentially harmful oral flora, become opportunistic in the dark, warm, moist and unkempt oral environment. (Table 3) They quickly multiply their populations exponentially.

Oral flora are most thoroughly and effectively removed by the ICU nurse with mechanical cleansing of the teeth, gingiva, and oral mucosa with a soft toothbrush, along with the use of oral topical antimicrobials.\textsuperscript{4,10,11} The Centers for Disease Control (CDC) specifically advises that each ICU patient should be part of an oral hygiene program with frequent gentle brushing of the teeth and gingiva, mouth swabbing with an antiseptic agent, and in the endotracheally intubated and mechanically ventilated (EIMV) patient, frequent suctioning of the mouth and subglottic areas.\textsuperscript{12}

Table 2  \textbf{Normal Oral Flora}\textsuperscript{8,9}

<table>
<thead>
<tr>
<th>Normal Oral Flora</th>
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<tbody>
<tr>
<td>Staphylococcus epidermidis</td>
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<tr>
<td>Staphylococcus aureus</td>
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<td>Streptococcus mitis</td>
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<td>Streptococcus salivarius</td>
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<td>Streptococcus mutans</td>
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<td>Streptococcus pneumoniae</td>
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<td>Streptococcus pyogenes</td>
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<td>Enterococcus faecalis</td>
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<td>Neisseria species</td>
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<tr>
<td>Neisseria meningitides</td>
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<tr>
<td>Escherichia coli</td>
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<tr>
<td>Proteus species</td>
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<tr>
<td>Pseudomonas aeruginosa</td>
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<tr>
<td>Haemophilus influenzae</td>
</tr>
<tr>
<td>Bacteroides species</td>
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<tr>
<td>Bifidobacterium bifidum</td>
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<tr>
<td>Lactobacillus species</td>
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<tr>
<td>Clostridium species</td>
</tr>
<tr>
<td>Clostridium tetani</td>
</tr>
<tr>
<td>Corynebacteria</td>
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<tr>
<td>Mycobacteria</td>
</tr>
<tr>
<td>Actinomycetes</td>
</tr>
<tr>
<td>Spirochetes</td>
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Mycoplasmas
Yeasts
Protozoa
Herpes simplex virus Type 1 and Type 2
Candida albicans

Table 3  A List of Possible Oral Problems in the ICU Patient
Caries (tooth cavities) - Streptococcus mutans
Halitosis
Periodontal inflammation
Periodontal infection
Osteomyelitis
Ventilator-associated pneumonia (VAP)
Septicemia

EIMV patients can pose problems in performing oral care by the ICU nurse. It is especially crucial that these patients receive proper oral care for Ventilator-Associated Pneumonia (VAP) can occur VAP accounts for 10-47% of infections in patients in the ICU. Each day the patient is EIMV increases their chance of developing pneumonia 1%. VAP can extend the patient’s hospital stay and significantly drive up their hospital costs, by some estimates as much as $40,000.00.

The EIMV patient generally has their endotracheal tube held in place with either tape or a cloth/foam endotracheal tube holder. This hampers access to the entirety of the mouth by the nurse as well as providing a breeding ground for oral flora. These pathogens then migrate down the endotracheal tube, carried along by saliva, through the space between the endotracheal tube and the vocal cords, down the trachea, and proceed into the lungs. VAP is most commonly caused by Gram-negative enteric bacteria, and two species of normal oral flora (Pseudomonas aeruginosa, and Staphylococcus aureus).

One can see the need for simple, safe, and effective OAC for both the patient and the ICU nurse. Although, even the best of OAC, while significantly affecting the development of VAP, does not affect the duration of ventilation needed by the patient, the length of ICU stay, or the longer survival of the patient.
We will now develop a simple assessment tool to detect oral debris and inflammation, provide a simple, easily-gathered list of armamentaria which are used bedside to properly and effectively cleanse the oral cavity, and discuss some simple techniques taught to the Registered Dental Hygienist (RDH) which can be employed by the bedside ICU nurse.\textsuperscript{16}

**Assessment**

Hayes and Jones developed the BRUSHED assessment tool, which can be used by the ICU nurse to assess the degree of severity of problems in the patient’s oral cavity.\textsuperscript{4,17} (Figure 1)

Figure 1 The BRUSHED Oral Assessment Tool [adapted from Hayes and Jones]

B Bleeding (gingiva, oral mucosa, what is the patient’s coagulation status?)

R Redness (gingiva, tongue, dry mouth, antibiotic stomatitis)

U Ulceration (size of ulcer, shape of ulcer, herpetic cold sore, canker sore, infected?)

S Saliva (thin/watery, thick, copious amounts, xerostomia [dry mouth])

H Halitosis (character, acidotic, infection, absence of)

E External Factors (angular cheilitis [cracks and redness at corners of the mouth], endotracheal tape or endotracheal tube holder cleanliness)

D Debris (visible plaque, foreign substances, presence on endotracheal tape or endotracheal tube holder)

The ICU nurse should assess the gingiva for signs of disease. This should include color, size, shape, consistency and surface texture. Some examples of diseased gingiva are bright red, enlarged, bulbous, spongy, smooth, and shiny gingiva. Other signs to look for would be ulcerations or sores on the oral mucosa. After the assessment the nurse will begin hygiene care.

**Oral Care Technique**

Figure 2 Armamentaria

1. Latex Gloves
2. Protective Facemask
3. Protective eyewear (One for the patient and one for the nurse)
4. Disposable chuck
5. 0.12% chlorhexidine gluconate (2 ounces in a plastic cup)
6. Pediatric size toothbrush with soft bristles
7. Oral Balance Moisturizing Gel
8. Petroleum jelly
9. 4 x 4 cotton gauze
10. A roll of one inch tape
11. Clean Yankauer suction tip and clean suction tubing
12. Adequate lighting

**Technique**

1. Note the depth of the endotracheal tube in relation to a facial landmark, and then secure the tube to the side of the face with tape.
2. Gently place a slightly moistened 4x4 cotton gauze in the back of the throat as a throat pack.
3. Dip the toothbrush into the 0.12% chlorhexidine gluconate and gently brush all surfaces of the teeth in a circular motion, rewetting the toothbrush bristles as needed.
4. Suction the oral cavity as needed.
5. The tongue should be gently grasped with the gloved fingers and brushed in a back and forth motion.
6. Apply petroleum jelly to the cotton roll, and place on the patient's lips.
7. [Note: One can apply a pea size of Oral Balance moisturizing gel to a gloved finger and gently massage onto the mucous membranes of the patients mouth.]

Aggregated bacteria excrete an adhesive matrix and form a substance called biofilm. The American Dental Association (ADA) recommends removing biofilm two times daily. Chlorhexidine gluconate has antimicrobial activity that lasts up to 24 hours. A study conducted by the Official Journal of the Confederation of Australian Critical Care Nurses, reports oral care given in 4-hour intervals improved the condition of the oral mucosa, lips, and tongue. At 2-hour intervals there was also improvement in gingival tissue and removal of soft debris. Oral care should be individualized based on the assessment needs of the patients' condition.

OAC should be performed for both patients with teeth, and those patients who are edentulous. If the patient is edentulous the gingiva, palate, and tongue should still be gently brushed. The patient's dentures or removable partial dentures should be carefully wrapped so that they are kept visible to the staff, and not discarded in the trash, and should never remain in the EIMV patient's mouth. It should be sent with family, or left with hospital security.
Research has found that foam swabs, traditionally used for oral care in the ICU, do not remove biofilm effectively, therefore the pediatric toothbrush is recommended. Sodium Bicarbonate and hydrogen peroxide can chemically burn oral mucosa. Lemon and glycerin have been used in hospital settings for more than 70 years, and now are thought to be more harmful, because of their high acidity and dehydration of oral mucosa.

Referral to Staff Dentist or Physician

The ICU nurse should not hesitate to question any assessed areas and refer any noticed deviations from normal healthy tissues. Any suspicious oral exudates, odors, red tissues, bleeding, or sores should also be noted in the patient’s chart. The mouth, head, and neck each command a large portion of the body’s blood supply, and therefore infection can quickly spread throughout the body, hindering the patient’s progression toward wellness. As well, disease is generally easier to treat in its early stages.

Finally, biofilm, as discussed above, provides the aggregated bacteria within the film extraordinary powers to cause inflammation, infection, caries, and other damage. David Davies, PhD., a biologist from Binghamton University in Binghamton, New York, has reported in the December Journal of the American Dental Association an exciting breakthrough. He has developed a dispersion-inducing molecule, which breaks up bacterial biofilm aggregates into individual bacterial masses, called the planktonic form. In their planktonic form, bacteria are more effectively attacked and treated with antibiotics, allowing the body to fight the infection more effectively. Dr. Davies envisions the molecule to be used at first to fight non-healing wounds. Perhaps the molecule will also eventually used to disperse oral biofilms to assist in more effective oral hygiene.

References:


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