Oral Hygiene
ICU14

Written by Sue Eastham, December 2010

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Definition
Oral hygiene is defined as ‘the scientific care of the teeth and mouth’ (Xavier 2000). The principle objective of mouth care is to maintain the mouth in good oral condition that is comfortable, clean, moist and free of infection.

Aims of good mouth care (Mallett and Dougherty 2000):

- Achieve and maintain oral cleanliness
- Prevent infection
- Keep oral mucosa moist
- Promote patients comfort
- Identify at risk patients
- Keep lips clean, soft, moist and intact.
- Remove debris and plaque.

Introduction

Comprehensive oral hygiene has consistently been recognised as critical to the prevention of pneumonia in the hospitalized patient. Effective oral hygiene prevents colonisation of pathogens which can lead to secondary pulmonary infection.

The oral flora of critically ill patients differs from that of healthy individuals and contains organisms that can rapidly cause pneumonia. Within 48 hours of admission, the composition of the or pharyngeal flora of critically ill patients undergoes a change from the usual predominance of gram-positive streptococci and dental pathogens to predominantly gram- negative organisms, constituting more virulent flora, including pathogens that cause Ventilator Acquired Pneumonia (VAP) (Munro 2004). Also, increased levels of proteases in the oral secretions of critically ill patients removes from their epithelial cell surfaces, a glycoprotein substance called fibronectin. Normally, fibronectin is present on cell surfaces and acts as a host defence mechanism, blocking pathogenic bacterial attachment to oral and tracheal mucus membranes. This depletion of fibronectin allows cell receptor sites to replace normal flora with virulent pathogens such as Pseudomonas aeruginosa on buccal and pharyngeal epithelial cells (Gibons 1989).
If the intubated patient does not receive effective, comprehensive oral hygiene, dental plaque and hardened bacterial deposits develop on the teeth within 72hrs. This is followed by emerging gingivitis, gum inflammation, infection and a subsequent shift from primarily Streptococcus and Actinomyces spp. to increasing numbers of aerobic gram-negative bacteria (Berry 2006).

Since adhesion to a surface in the mouth is important for the continued existence and proliferation of organisms, bacteria which attach to the tooth surface gradually lose coalesce to produce a biofilm and after further development, lead to the formation of dental plaque (Bagg 1999).

**Saliva**

Saliva is also critical for the oral environment. The continuous production of saliva is essential to keeping the mouth and its components clean and moist. By definition, saliva is a mixed fluid secreted predominantly from the parotid, submandibular glands. It has a number of important functions such as washing food debris and unattached microorganisms from the mouth. It neutralizes acids produced by bacteria on tooth surfaces and because it contains calcium and phosphorus, works together with fluoride in the remineralisation of tooth surfaces. In addition, saliva contains a number of immune substances such as immunoglobulin A, which obstructs microbial adherence in the oral cavity, and lactoferrin which inhibits bacterial infection in the healthy individual (Bagg 1999).

In the intensive care patient, a severe reduction of salivary flow and subsequent xerostoma (Adachi 2002) and mucosistis (Scannapieeco 2001) may result in oropharyngeal colonization with respiratory pathogens and the progression to VAP. During the day, in the healthy individual, unstimulated salivary flow ranges from 0.25 to 0.35mL/min while stimulated flow may reach quantities of 4 to 6 mL/min. Severe xerostomia is defined as an unstimulated salivary flow of less than 0.1 mL/min (Dennesen 2003). Conditions in the critically ill which impact salivary flow include fever, diarrhoea, burns, reduced fluid intake and a number of medications such as opiates, anticholinergics and diuretics.

Studies by Dennesen et al. have documented a nearly absent salivary flow in intubated, sedated ICU patients which can be explained by several circumstances such as the severity of the disease resulting in intubation and admission to the ICU, lack of normal oral intake, fluid balance disturbances, extended use of morphine required because of controlled mechanical ventilation or pain management. Apart from the inadequate flow, the saliva is not distributed throughout the oral cavity in a supine, sedated patient and severe xerostomia is therefore generally present in ICU patients.

As mucositis or oral inflammation increases in the intubated patient’s mouth, the level of oral bacteria increases as well. The greater the level of oral bacteria, the
more biofilm will attach to the patient’s teeth. Allowing build up of biofilm (dental plaque) increases the bacterial load in oropharyngeal secretions. All patients aspirate secretions, even non-ventilated patients. The greater the amount and microbial contamination of aspirated secretions, the more likely pneumonia will occur.

**Oral Care Interventions and the Evidence-Based Rationales**

Several organizations and patient safety initiatives, including the Centres for Diseases Control (CDC), the Association for Professionals in Infection Control and Epidemiology (APIC) and the Institute for Healthcare Improvement (IHI) have developed evidence-based patient-care treatment practices for reducing the occurrence of HAP and VAP.

Comprehensive oral hygiene has consistently been recognised as critical to the prevention of pneumonia in the hospitalised patient. The CDC Guidelines for preventing Healthcare-Associated Pneumonia recommend making patent oral hygiene standard practice as a VAP strategy. Routine oral decontamination is an effective method for reducing VAP by decreasing the microbial load in the oropharyngeal cavity. It has been found that the incorporation of routine oral hygiene into standard practice may reduce VAP by as much as 60% (Scannapieco 2001).

**Conclusion**

Inadequate or improper oral care puts patients at risk for hospital-acquired pneumonia. Pneumonia is a prevalent, morbid infectious disease that accounts for approximately 15% of all hospital acquired infections. Due to the severity of this disease, it is imperative that medical personnel become knowledgeable of the clinical classifications of pneumonia and risk factors associated with development of hospital acquired pneumonia. Ventilated patients are especially at risk from pneumonia as their normal host defences and secretion clearance are disrupted by assisted-breathing devices. Establishing and following effective pneumonia strategies is essential in reducing the occurrence of pneumonia. One prevention strategy that is often overlooked is a comprehensive oral care protocol that requires a thorough understanding of the oral environment’s role in the development of pneumonia. By incorporating a comprehensive oral care protocol into the units current VAP reduction bundle of best practices, lives can be saved!!

**Procedure for Endotracheal Tube and Oral Care**

<table>
<thead>
<tr>
<th>Action</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explain and discuss the procedure with the patient</td>
<td>To ensure, were possible, the patient understands the procedure and gives consent</td>
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<tr>
<td>2.</td>
<td>Wash hands and don personal protective equipment.</td>
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<td>3.</td>
<td>Support the endotracheal tube and tubing as needed.</td>
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<tr>
<td>4.</td>
<td>Inspect the patient’s mouth with the aid of a torch and tongue depressor.</td>
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<td>5.</td>
<td>Perform oral hygiene using a soft toothbrush. The mouth should be cleaned with chlorhexidine gluconate (gel) 6hrly. Teeth should be brushed 12hrly with standard toothpaste. A gap of at least 2 hours should be left between chlorhexidine gluconate application and tooth brushing.</td>
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<td>6.</td>
<td>Suction oral cavity/pharynx frequently. If subglottic tube in situ, aspirate 2hrly</td>
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<td>7.</td>
<td>Move oral tube to the other side of the mouth.</td>
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<td>8.</td>
<td>Ensure proper cuff inflation.</td>
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<td>9.</td>
<td>Reconfirm tube placement.</td>
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<td>10.</td>
<td>Secure ET tube in place</td>
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<td>11.</td>
<td>Ventilator tubing management</td>
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References


