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Original

Survey on the Issues and the Changes of Oral Health Condition of Inpatients in the Intensive Care Unit

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Abstract: The aim of this study was to consolidate oral health management systems in the acute stages. The practical status of oral health in perioperative patients and improvements achieved through coordinated oral health care were investigated. Subjects of the present study were 87 patients who underwent oral intubation in the intensive care unit (ICU). These patients attended an oral health care center from October 2010 to March 2011. Dentists rated the oral status of subjects within 24 h of admission to the ICU on a three-point scale by assessing the lips, teeth, mucous membrane, gingiva, tongue, and saliva. In addition, the number of *Candida* colonies detected on the tongue was noted at initial assessment. At initial assessment, 70% of participants with respiratory diseases were classified as having oral problems. However, few subjects showed presence of dental plaque or reported problems involving the mucous membrane. The proportion of *Candida*-positive participants was higher in those with respiratory diseases than those with cardiovascular diseases. When comparing the *Candida*-positive and -negative subjects, a greater proportion of the former had problems with the lips, saliva, mucous membrane, and tongue. With regard to the time-dependent changes recorded on these problems, improvement in the condition of the lips tended to occur earlier than the conditions of the tongue. As it has been suggested that maintaining a clean tongue can be critical in patients undergoing oral intubation, it is important to continue appropriate oral health care in the acute stages.

Key words: acute stage, intensive care unit, oral health care, oral intubation.

Recent studies suggest that oral health care can be effective in the prevention of respiratory tract infections such as pneumonia and bronchitis.^{1~5)} Since one of the parameters most frequently emphasized is the prevention of ventilator-associated pneumonia (VAP), which is a

severe respiratory infection seen in patients with poor oral hygiene undergoing mechanical ventilation, oral health care has gained recognition as a key nursing intervention in the acute stages.^{6~9)} However, difficulties can be encountered while trying to maintain good oral health

care in acutely ill patients ventilated mechanically, partly because of oral intubation and partly because of their inability to maintain oral hygiene by brushing teeth. Such situations can lead to bacterial contamination of the oral and pharyngeal areas. On the other hand, it is reported that oral cleaning and functional support from the early phase in the acute stages is effective in avoiding secondary infectious diseases.^{10, 11)} Based on these findings, studies have examined the activities and efforts by dentists and dental hygienists in the arena of professional oral health care in the acute or emergency stage.^{12~14)} On the other hand, these reports indicated that how the oral health status of patients was an indicator of the difficulties faced when aiming to improve the oral health with regard to general health issues and exacerbation of diseases.¹⁵⁾ Moreover, although a broad range of symptoms in the oral cavity could be improved fairly easily while others could not, few studies have been conducted on the process of improving oral health problems through intervention by dental professionals in the acute stages.^{16, 17)}

Showa University Oral Health Care Center was established in April 2008 in cooperation with a multidisciplinary team to implement oral health care and to create a standardized method of oral health care for patients in the acute stages. Feedback from facilities providing oral health care in the general wards of acute hospitals indicated that the characteristics of oral health and prevalence of intraoral problems varied among patients depending on their primary illness.¹⁷⁾ Therefore, on the basis of the assumption that patients in the ICU have the same range of oral problems as those in general wards, the oral health status of the ICU patients was investigated and compared statistically among groups classified by primary diagnosis. It was hypothesized that the oral health status of patients would be worse when the oral bacterial flora levels increase. The objective of the present study was to establish an oral health care system in acute hospitals that focused on the prevention of secondary infectious diseases. Therefore, the oral health status of patients admitted to the ICU was investigated and any change was monitored following multidisciplinary oral

health care management, which included dentists and dental hygienists.

Materials and Methods

The subjects of this study were 87 patients (49 male and 38 female) in the ICU of Showa University Hospital and who underwent mechanical ventilation and oral intubation between October 2010 and March 2011. All subjects were consulted by dentists attached to the Showa University Oral Health Care Center, and their consent for participation in this study was obtained prior to commencement of the investigation. Data regarding the subjects' primary disease diagnoses were obtained from the medical and nursing records of the ward, and the subjects were categorized into the following four groups: cerebrovascular disease group, respiratory disease group, gastrointestinal disease group, and cardiovascular disease group. This classification was determined by reference to previous studies, and Table 1 shows typical diagnosis by group.^{12, 17)} The following categories of patients were excluded: those with undiagnosed primary disease, such as multisystem diseases; those who had developed metastasis secondary to carcinoma; and edentulous individuals.

The oral health status of participants was evaluated by dentists and dental hygienists attached to the Oral Health Care Center within 24 h of admission to the ICU as the initial assessment. Evaluation criteria were based on the Revised Oral Assessment Guide (ROAG), with the exception of the items "vocalization" and "swallowing," and were rated on a three-point scale (Table 2).^{18, 19)} Daily oral health care in the ICU was provided every 6 h (06:00, 12:00, 18:00, 24:00), and the oral health condition was evaluated between 13:00 and 14:00. Oral health care in the ICU was performed by nurses using commercial toothbrushes and mouth swabs. Syringed water was not used, but intraoral suction by vacuum tube was included. The protocol of oral health care was standardized through the training of dental professionals prior to the onset of interventions, which were monitored by dental hygienists. When a rate of 2 or 3 was observed for any assessment

Table 1 Major diagnosis in each group.

| Disease group | Examples of diagnosis |
|--------------------------|---|
| Cerebrovascular disease | Cerebral infarction, subdural hematoma, subarachnoid hematoma, traumatic head injury |
| Cardiovascular disease | Thoracic aortic dissection, aortic aneurysm, cardiac infarction |
| Respiratory disease | Pneumonia (including aspiration pneumonia), phthisis, acute respiratory distress syndrome |
| Gastrointestinal disease | Bowel cancer, intestinal perforation |

Table 2 Assessment items and criteria.

| Category | Rating 1 | Rating 2 | Rating 3 |
|-----------------|---|--|--|
| Lips | Smooth and pink | Dry or cracked, and/or angular cheilitis | Ulcerated or bleeding |
| Teeth/dentures | Clean, no debris | Plaque or debris in local areas | Plaque or debris generalized |
| Mucous membrane | Pink and moist | Dry and/or change in color, red blue-red or white | Very red, or thick, white coating Blisters or ulceration |
| Gums | Pink and firm | Edematous and/or red | Bleeding easily under finger pressure |
| Tongue | Pink, moist and papillae present | Dry, no papillae present or change in color, red or white | Very thick white tongue coating Blisters or ulceration |
| Saliva | No friction between the mouth mirror and mucosa | Slightly increased friction, no tendency for the mirror to adhere the mucosa | Significantly increased friction, the mirror adhering or tending to adhere to the mucosa |

item, the problems were explained and instructions on the appropriate remedial treatment, such as the usage of oral moisturizing gel, were conveyed to the attending nurses by the dental professionals. At initial evaluation, swabs of biologic specimens were obtained from the surface of the tongue in contact with the endotracheal tube (approximately 20 mm from the tip of tongue). Specimens were then cultured for 48 h at 37°C on selective agar medium (Kanto Chemical Co., Inc., Tokyo, Japan), and the number of colony-forming units (CFU) of *Candida* was counted. Oral health status was evaluated once per day after initial evaluation and continued until either oral intubation was no longer required or the patient was moved to another ward.

Following intervention, patient data on the classification of diagnosis and detection of *Candida* were collated, and the frequently noted changes in oral health status were investigated for patients undergoing three or more interventions.

Prevalence of oral health problems based on ROAG was compared among the four groups by both the chi-square and Steel-Dwass tests. Comparison of detection rates among the disease groups and comparison between the detection of *Candida* and prevalence of oral health

problems was processed statistically by the chi-square test. All statistical analyses were performed using SPSS 16.0 (SPSS, Tokyo, Japan).

All experimental protocols of this study were approved in advance by the institutional review board of the School of Dentistry, Showa University (Approval number 2010-22).

Results

Mean age and standard deviation of subjects was 63.7±13.2 years (range, 42–90). Patient characteristics are shown in Fig. 1.

Figure 2 shows the oral health status of subjects at initial evaluation. Prevalence of “Lip” problems was 23.5% and 25.0% in the cerebrovascular and respiratory disease groups, respectively, with both groups including subjects evaluated with the rating 3. For problems related to the items “Teeth/dentures” and “Gingiva,” the rate was <10% in all groups, and no subject was rated as 3. In the cerebrovascular disease group, 11.8% and 5.9% of subjects were as rated 2 and 3, respectively. The rating of “Tongue” problem in the respiratory disease group yielded the highest percentage (70%), and prevalence of this problem in the other three groups was also higher than

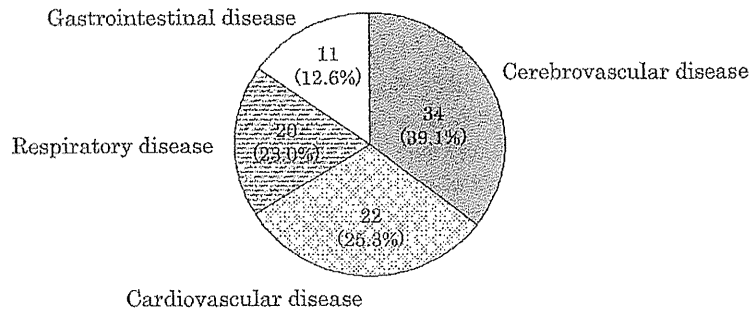


Fig. 1 Main diagnosis of subjects.

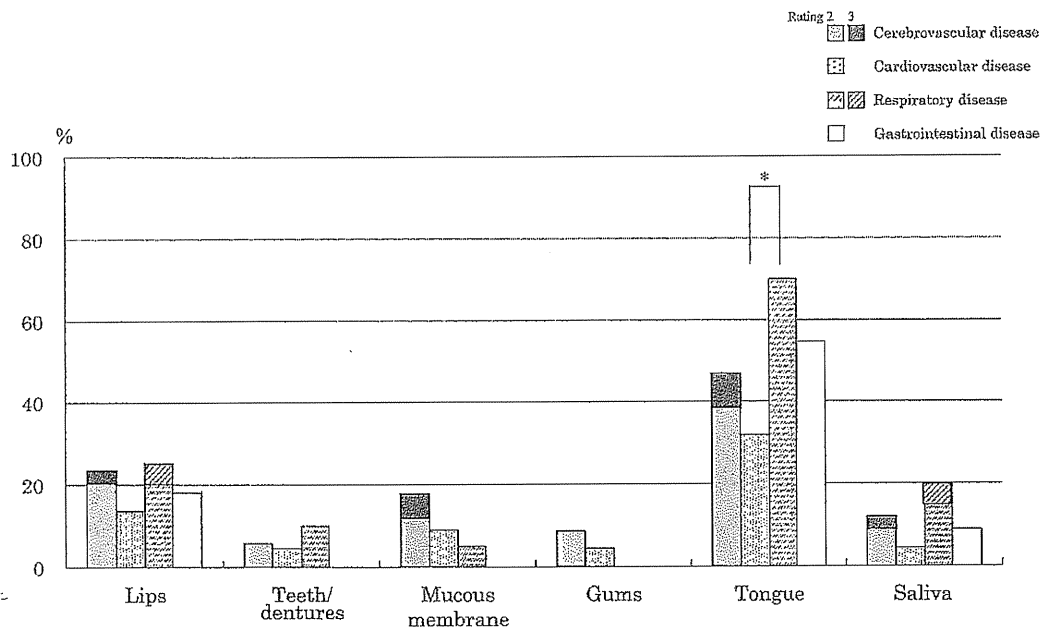


Fig. 2 Frequencies of problems of oral health.

* : $p < 0.05$ by chi-squared test and Steel-Dwass test.

Table 3 Number of CFU of *Candida* specimen and detection rate

| Disease group | <i>C. albicans</i> | <i>C. glabrata</i> | <i>C. krusei</i> | <i>C. tropicalis</i> | <i>C. parapsilosis</i> |
|--------------------------|--------------------|--------------------|------------------|----------------------|------------------------|
| Cerebrovascular disease | 7/34 (20.6%) | 2/34 (5.9%) | 1/34 (2.9%) | 2/34 (5.9%) | 2/34 (5.9%) |
| Cardiovascular disease | 2/22 (9.1%) | 2/22 (9.1%) | 2/22 (9.1%) | 0/22 (0%) | 0/22 (0%) |
| Respiratory disease | 4/20 (20%) | 2/20 (10%) | 1/20 (5.0%) | 0/20 (0%) | 2/20 (10%) |
| Gastrointestinal disease | 2/11 (18.2%) | 1/11 (9.1%) | 0/11 (0%) | 0/11 (0%) | 0/11 (0%) |

that for the other items. There was a statistically significant difference ($p < 0.05$) between the prevalence in the respiratory and cardiovascular disease groups on tongue. Twenty and percent of the subjects in the respiratory and 11.8% in the cerebrovascular disease group were rated as

2 or 3 for the item "Saliva."

Figure 3 and Table 3 show the detection rate for various *Candida* species. The number of subjects negative for *Candida* was 20 (58.8%) in the cerebrovascular, 16 (72.7%) in the cardiovascular, 11 (55.0%) in the

respiratory, and 8 (72.7%) in the gastrointestinal disease groups. In addition, more than 100 CFU were observed in two subjects both in the cerebrovascular and respiratory disease groups (5.9% and 10.0%, respectively). However, the detection rates of the 4 disease groups did not show statistic difference ($p=0.66$). Among the *Candida* species, the prevalence of *C. albicans* was highest, especially in the cerebrovascular disease group (7 subjects, 20.6%), which was higher than that for the other groups. Other

Candida species detected were *C. glabrata*, *C. krusei*, *C. tropicalis*, and *C. parapsilosis*, all showing rates lower than that of *C. albicans*.

Figure 4 shows the prevalence of oral health problems in the four groups according to positive or negative presence of *Candida*. In the cerebrovascular disease group, the prevalence of problems with the items "Lips" and "Tongue" was significantly higher in the *Candida*-positive subjects than in the *Candida*-negative subjects ($p<0.05$). Similarly, the prevalence of problems with the items "Mucous membrane" in the cardiovascular disease group and "Tongue" in the respiratory disease group was higher in the *Candida*-positive subjects ($p<0.05$). No *Candida*-negative subjects indicated any problems in regard to the items "Lips," "Teeth/dentures," "Mucous membrane," "Gingiva," or "Saliva" in the cardiovascular and respiratory disease groups.

In the gastrointestinal disease group, all the *Candida*-negative subjects indicated problems with the item "Tongue." On the other hand, no *Candida*-negative subjects in this group were rated as 2 or 3, except for the

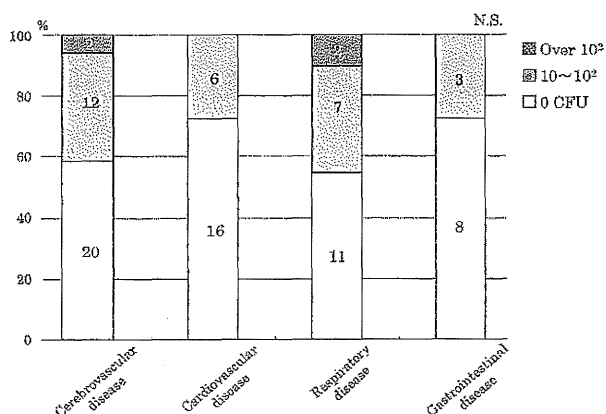


Fig. 3 Detection rate of *Candida* specimen. N.S.: Not significant by chi-squared test.

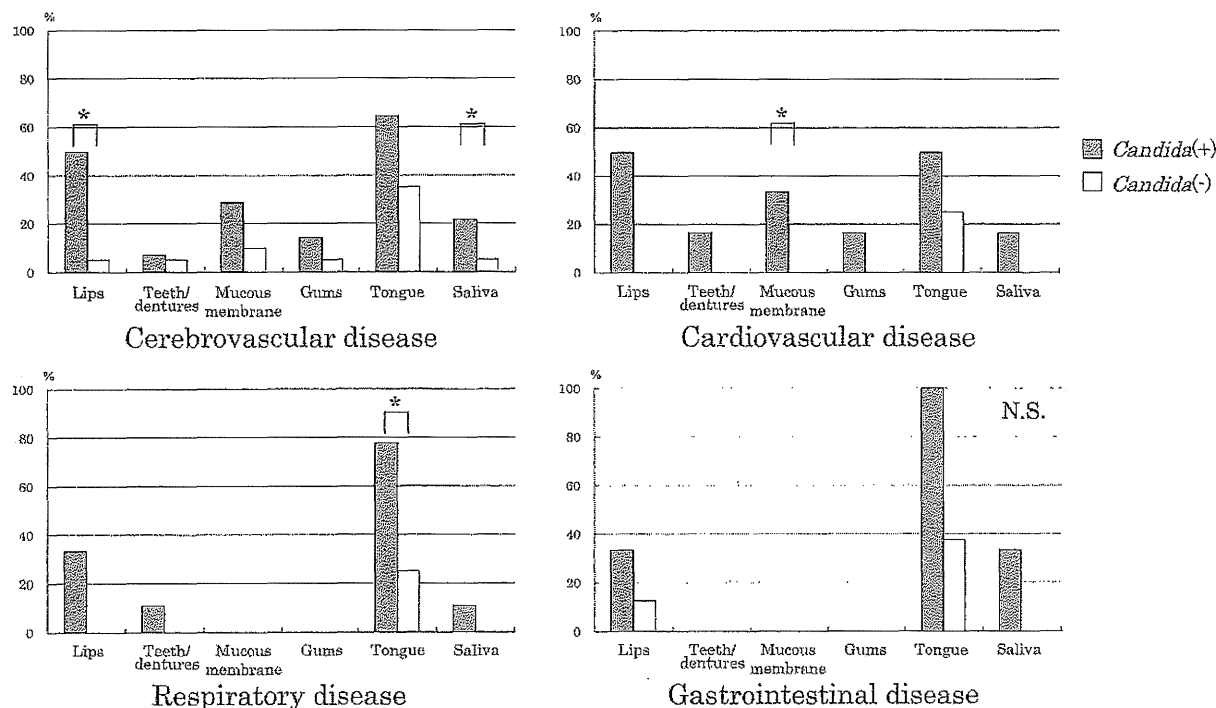


Fig. 4 Frequencies of oral health regarding to detection of *Candida* specimen. * : $p<0.05$ by chi-squared test. N.S.: Not significant.

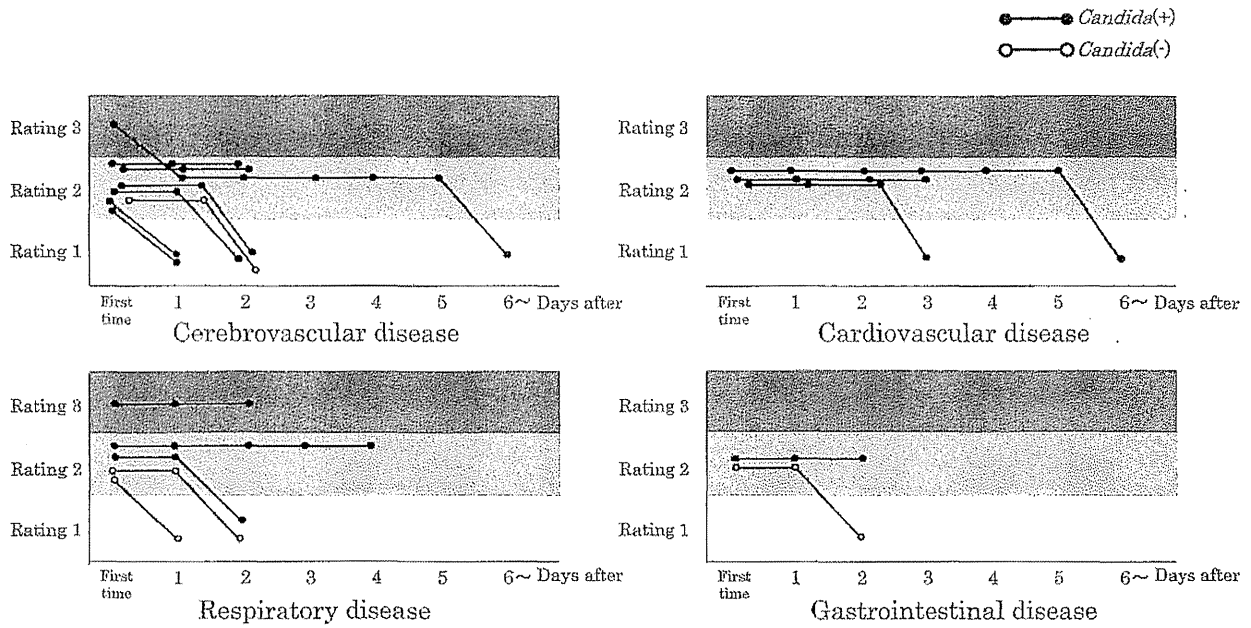


Fig. 5 Changes of the condition of lips.

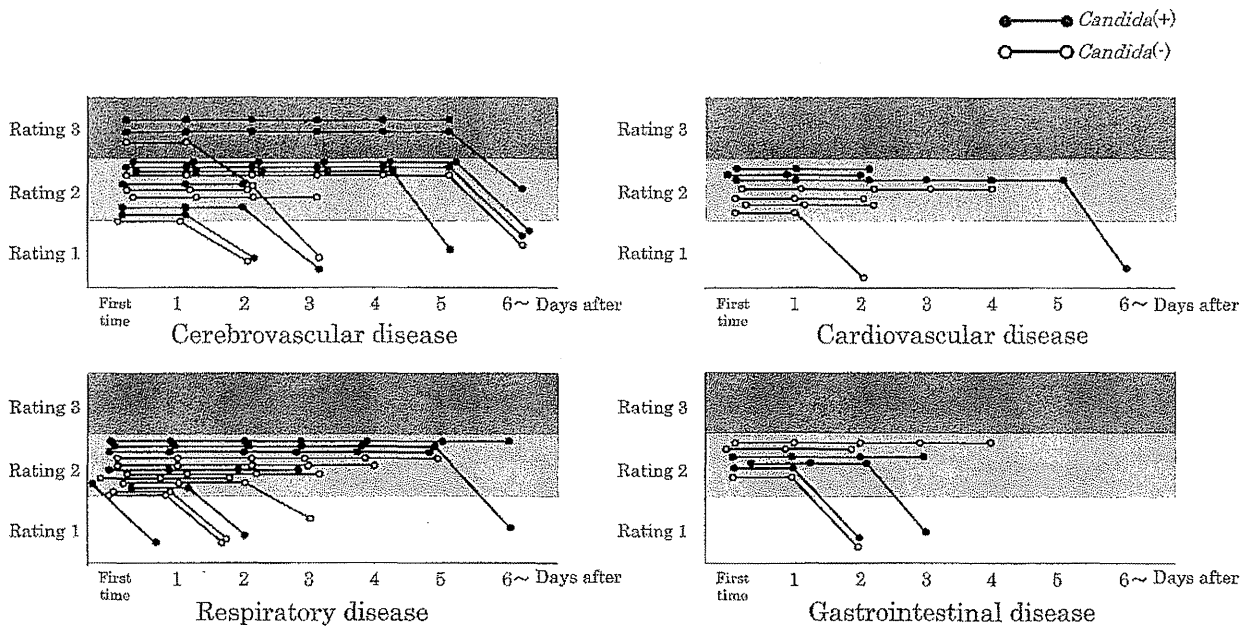


Fig. 6 Changes of the condition of tongue.

items "Lips" (1 subject, 12.5%) and "Tongue" (3 subjects, 37.5%).

Figures 5 and 6 show changes in the rates for the items "Lips" and "Tongue," respectively, in subjects who received three or more interventions. For the item "Lips," the number of subjects rated as 2 or 3 at initial evaluation was eight, three, five, and two in the cerebrovascular,

cardiovascular, respiratory, and gastrointestinal disease groups, respectively. Among these, only two subjects in the respiratory disease group and one each in the cerebrovascular and gastrointestinal disease groups were *Candida*-negative. In the cerebrovascular disease group, two subjects rated as 2 changed to the rating of 1 after 1 day, and similarly three changed after 2 days, while

two subjects showed no improvement by the end of interventions. The remaining subject with a rating of 3 at the initial evaluation was downgraded to the rating of 2 after 1 day, and again downgraded to the rating of 1 six days after the onset of intervention. In the cardiovascular disease group, two subjects showed improvement in the rating after 3 and 6 days, with no change in the rate in the third subject. In the respiratory disease group, the rate in two *Candida*-negative subjects was downgraded from the rating of 2 to 1 after 1 or 2 days, however, 2/3 *Candida*-positive subjects showed no improvement by the end of interventions. Similarly, in the gastrointestinal disease group, one *Candida*-positive subject was downgraded from the rating of 2 to 1 after 2 days.

The number of subjects rated as 2 or 3 at initial evaluation for the item "tongue" and who received three or more interventions was 14, seven, 13, and six in the cerebrovascular, cardiovascular, respiratory, and gastrointestinal disease groups, respectively. Of these subjects, five, four, seven, and three were *Candida*-negative in the cerebrovascular, cardiovascular, respiratory, and gastrointestinal disease groups, respectively. In the cerebrovascular disease group, the rating of one *Candida*-negative subject was reduced from the rating of 3 to 1 after 3 days, though in two *Candida*-positive subjects, the rating of 3 was not changed to 1 until the end of interventions. To summarize, ratings were downgraded to the rating of 1 in 5/9 *Candida*-positive subjects and in 3/5 *Candida*-negative subjects. In the cardiovascular disease group, although one *Candida*-positive and one *Candida*-negative subject were downgraded to the rating of 1, no change was recorded in the other subjects of that group. Downgrading of the *Candida*-negative subject occurred at 2 days, which was earlier than that for the *Candida*-positive subjects. In the respiratory disease group, ratings were downgraded to the rating of 1 in 3/6 *Candida*-positive subjects and in 3/7 *Candida*-negative subjects. In the gastrointestinal disease group, at 2–3 days the ratings were downgraded to 1 in 2/3 *Candida*-positive subjects and in 1/3 *Candida*-negative subjects.

Discussion

There is an increasing awareness of the importance of oral care to prevent respiratory infections in acute medicine as well as home health care and nursing care facilities.^{18–20} In particular, general body and swallowing functions and immunity are often reduced in the acute phase of systemic disorders and perioperative period of surgery. Therefore, oral care is offered as a means to prevent ventilator-associated pneumonia and postoperative infections.^{15, 20, 21} In the present study, dentists and dental hygienists assessed the oral health of patients and developed and implemented appropriate oral care methods in collaboration with nurses in the ICU, and the effects on oral health problems were examined.

Regarding oral problems, although differences were noted for the item 'Tongue' between the disease groups, there was no marked difference for five other items. Patients with oral intubation often develop oral dryness or a coated tongue, which causes abnormalities of the dorsum of the tongue, as they are unable to close their mouth, or due to parenteral nutrition and drugs.²² For this reason, xerostomia and an increase in opportunistic microorganisms were noted in patients, those with respiratory diseases in particular, whose respiratory status had worsened prior to being admitted to the ICU.²³ In addition, large amounts of sputum and secretions are sometimes identified in the mouths and throats of patients with cerebrovascular and respiratory disorders receiving oral care.¹⁷ Since they can be risks of respiratory infections as well, it is very important to closely observe the dorsum of the tongue and throat in the assessment of oral health. The item 'Saliva' assessed the level of dryness on the mucous membrane of the oral cavity other than the dorsum of the tongue. In the present study, there were no marked differences between the disease groups: the highest incidence of oral dryness was 20%. The percentage of oral dryness noted in the subjects of the present study was relatively low when compared to the incidence of oral dryness in acutely-ill patients reported by previous studies: 30 to 70%.^{12, 17} Oral care provided four times a day in the ICU and the effective use of a

moisturizer for the oral mucosa presumably improved oral dryness, although a number of factors other than a decrease in salivary secretion are also involved in the symptom, as described earlier.

In patients with oral intubation, damage to the lips or oral mucosa, which is attributed to physical stimuli generated when securing the tube in place or by body movement, is known to cause ulcers, dryness, and angular cheilitis.^{17, 18)} To address this, the position of the tube was regularly changed following intubation in the ICU, and the lips and mouth corners were moisturized to improve dryness; these nursing care procedures reduced the incidence of the above-mentioned symptoms. In addition to care in the oral cavity, it is important to prevent dryness around the lips.²⁴⁾ However, dryness and a decrease in secretions may occur due to the adverse effects of diuretic and psychotropic drugs. Therefore, it is important to determine whether oral dryness is attributed to the underlying disease and drugs or problems related to the oral function, since it is difficult to improve dryness by solely providing oral care. As a conclusion of this study, when providing oral health care, it is necessary to assess the level of oral dryness regardless of the type of underlying disease.

Candida species, fungi that live in the mouth, pharynx, and other parts of the digestive tract, include *Candida albicans* and *Candida glabrata*, and are common pathogenic species²⁵⁾. Although *Candida* species rarely cause oral candidiasis in healthy people, decreased immunity due to systemic disorders and microbial substitution attributed to the chronic administration of antibiotics may increase the likelihood of this disease.^{26, 27)} Regarding inpatients, the longer the period of hospitalization, the higher the infection risk; previous studies reported that *Candida* species were identified in the mouth of 35 to 54% of inpatients.^{27~29)} Furthermore, if patients have lowered immunity due to an underlying disease or medication, *Candida albicans* or *Candida glabrata* may be identified, even when no conspicuous lesion is noted.³⁰⁾ In the present study, although there were no noticeable symptoms of candidiasis in the mouth or on the pharyngeal mucosa of subjects, *Candida*

species were identified in 23 to 45% of them, with no underlying-disease-specific difference. *Candida albicans*, the most common type, and other *Candida* species were identified. In some cases, two or more *Candida* species were observed in a single person. These results, which are in line with those of previous studies, suggest that *Candida* species also proliferate in the mouths of patients hospitalized in the ICU.

Oral health problems were compared between patients with and without *Candida* species. Regarding 'Lips', 'Tongue', 'Mucous membrane', and 'Saliva', the patients with *Candida* species had more oral health problems, although the differences were not significant. The upper surface of a coated tongue includes not only desquamated epithelium but also a large number of *Candida* species and anaerobic bacteria. Furthermore, *Candida* species have been found on the lips and corners of the mouth, as well as the oral mucosa, of patients who have been using antibiotics for a long period of time. Therefore, the above-mentioned oral health problems suggest a possible increase in the number of *Candida* species. However, the proliferation of *Candida* species involves several factors.³⁰⁾ One of them is immune competence; a decline in immune competence is considered to be involved in oral candidiasis attributed to *Candida* species.^{31~33)} The present study did not take into account the immune competence of subjects. Further research should be conducted to closely examine the relationship between oral health problems and the identification of *Candida* species, using a larger number of subjects.

Regarding changes in oral health problems identified in the acute phase, previous studies reported that it may take a long time to improve a coated or dry tongue and decreased oral function.^{17, 33)} The present study examined changes over time in common symptoms included in the items 'Lips' and 'Tongue'. In all patients, although most of them did not have *Candida* species, lips-related symptoms were improved within one or two days of the intervention. On the other hand, in patients with *Candida* species, regardless of the disease group, the symptoms were not improved by the end of the intervention period,

or it took a long period of time to improve them. Whether or not angular cheilitis and dryness of the lips are attributed to the fungi has not yet been clarified because damage is often caused to the lips of intubated patients by physical stimuli, and *Candida* species were not collected from the lips and surrounding area in a previous study.²²⁾ Nevertheless, a candidal infection in the oral cavity may cause angular stomatitis and oral candidiasis.³⁰⁾ Since uniformed nursing procedures for intubation were implemented in the ICU to prevent damage to the soft tissue, the lips-related and angular symptoms were presumably caused by an increase in *Candida* species in the mouth, and it took a long period of time to improve them as ordinary oral care could not reduce the fungus. Further studies should be conducted to clarify whether the symptoms were caused by physical damage or infections, and follow-up their changes.

It took more time to improve problems included in the item 'Tongue' than those in the 'Lips', and patients often had a rating of 2 or 3 at the end of an intervention. Previous studies reported that it takes a long period of time to improve a dry or coated tongue-common symptoms often noted in the ICU and other acute care units.^{16, 17)} One reason is that, for intubated patients, the tube in the oral cavity makes it difficult to observe and clean the dorsum of the tongue. When the use of a tongue or sponge brush is allowed, sodium bicarbonate or hydrogen peroxide solution is sometimes used to remove the coating that has adhered to the tongue. However, in this study, chemical cleaning was not conducted in the ICU in order to prevent a small amount of chemicals from leaking into the trachea. As an intervention to clean the strong coating or dryness of the dorsum of the tongue, a commercially available moisturizer for the oral mucosa was used to moisten the mucosa and dorsum in the oral cavity and soften the coating. Whereas some patients responded to this treatment method, others did not, regardless of whether or not they had *Candida* species, which suggests a wide variety of causes of a coated or dry tongue. In fact, according to previous studies, a coated tongue is also attributed to a decrease in the oral function, changes

in salivary components and secretion, and a history of antibiotic use.^{34, 35)} Taking into account this point and the results of the present study, an increase in *Candida* species alone does not necessarily constitute the primary cause of oral health problems.

In light of these findings, all staff of Showa University Oral Health Care Center have placed emphasis on their efforts to understand the conditions of patients by referring to the records stored in the hospital units and the opinions of physicians and nurses in charge. It was suggested that, besides problems in the oral cavity, systemic diseases and medication also affected oral health. To provide interventions and improve oral health in an effective manner, collaboration with a variety of health professionals and a better understanding of medication and underlying diseases are required.

Conclusion

ICU patients with oral intubation, and in particular a high percentage of patients with a significant number of *Candida* specie, developed a wide array of symptoms, including a coated tongue, regardless of the underlying disease. As it takes a long period of time to improve these symptoms by conducting oral cleaning, it is important to implement effective and appropriate oral health management.

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Original

Changes in Oral Dryness of the Elderly in Need of Care —The Effect of Dentifrice with Oral Moisturizing Agents—

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Abstract: The aim of this study was to find a method for the elderly to cope with xerostomia and oral dryness. In particular, we investigated whether daily oral health care with a dentifrice that included a moisturizing agent could affect oral dryness. The subjects were 10 elderly women (mean age was 80.1 years old) who resided in a nursing home and were using a dentifrice that contained a moisturizing agent for daily oral health care. After three months of the beginning of using a dentifrice, the participants were classified into 2 groups, 5 women who continued to use the dentifrice and the others who stopped using the dentifrice for two months. An oral dryness evaluation was carried out with an oral mucosal moisture measurement and a saliva wetness test at the beginning of use of the dentifrice, three months and five months later. The oral mucosal moisture measurement of buccal and tongue mucosa indicated a significant improvement after 3 months of continued use of the dentifrice. However, all participants who had stopped using the dentifrice reverted to their prior oral dryness condition after five months. In the dentifrice group there was almost no variation for two months. These results show that application of a dentifrice with an oral moisturizing agent could improve the oral dryness of the elderly. When the elderly stop using the dentifrice, multidirectional intervention could be needed for fundamental improvement of oral dryness and xerostomia.

Key words: xerostomia, oral health care, elderly, moisturizing agent.

It is well known that saliva has important roles to maintain oral health: antibacterial activity, natural purification and a mucosal protective effect. Nevertheless, complaints about oral dryness and xerostomia have become increasingly common in recent years, and these symptoms are frequently shown in elderly people.¹⁻³⁾ Additionally, some studies have indicated that oral dryness is caused by a decrease in saliva production, thus, adversely affecting oral health and function.⁴⁻⁷⁾ Sjögren's syndrome, systemic lupus erythematosus and diabetes mellitus are diseases that bring on reduced secretion of saliva.⁸⁻¹¹⁾ It has been reported that the salivary gland function tend to become diminished in healthy elderly; however, the reduction of salivation in elderly is rarely different from that in young adults and there is little relationship between a decrease in saliva production and advancing age.¹²⁾ As it stands now, a decrease of

oral function, which may be affected by feeding and the taking of numerous medications, could contribute to oral dryness or xerostomia; it is, therefore, an important issue that needs to be dealt with.¹³⁾

Some methods used for xerostomia include administering artificial saliva and the use of pharmacological agents to develop secretion of saliva.^{14, 15)} However, these results indicate that patients with xerostomia had little beneficial effect or the duration was not long enough to remedy oral dryness.

In recent years several varieties of oral moisturizing gels for relief of oral dryness have gradually been coming into use.^{16, 17)} The moisturizing gels are easier to keep in the oral cavity than artificial saliva, and the gels can easily be used by a caregiver or by the elderly themselves. Therefore, these oral moisturizing products have been made available for nursing-care facilities and at-home

care. Some studies show that oral moisturizing gels for xerostomia have evanescent advantages for xerostomia caused by preoperative radiation treatment or Sjögren's syndrome.¹⁸⁻²⁰⁾ On the other hand, little research refers to the effect of oral moisturizing agents for xerostomia and oral dryness of the elderly, notably long-term changes of oral conditions.

The aim was to find a method for the elderly to cope with xerostomia and oral dryness. In particular, the changes and effectiveness were investigated whether daily oral health care with a dentifrice that included a moisturizing agent could affect oral dryness.

Subjects and Methods

The subjects were 10 elderly women who resided in a nursing home in Tokyo. All of the women showed xerostomia clinically in a dental check-up. The mean age was 80.1 years; the youngest woman was 72 years of age and the oldest was 94 years of age. Their nursing care level was 4 or 5, and only the caregivers of the nursing home cared for the subjects' oral health. Additionally, all participants had either partial or complete dentures and could easily eat meals. The subjects took daily medicines, including antihypertensive drugs, which might cause a decrease in saliva secretion. The subjects or their families were given an explanation of this study, and signed consent was obtained from each participant. The degrees of oral dryness of the objects were evaluated by the following two examinations:

1) Oral mucosal moisture measurement

The dryness of the tongue and the buccal mucosa were measured by an oral moisture tester (Mucus, LIFE Co., Ltd., Koshigaya).²¹⁻²³⁾ The tester measured the dorsal surface area of the tongue 10 mm from the tip, and the buccal mucosa from the angulus oris. Each measurement was repeated 3 times, and an average was calculated as a representative value. Figure 1 shows the measurement position of the oral mucosa.

2) Saliva wetness test (KISO-WeT, KISO science Co., Ltd., Yokohama)

A saliva wetness test was used for evaluation of

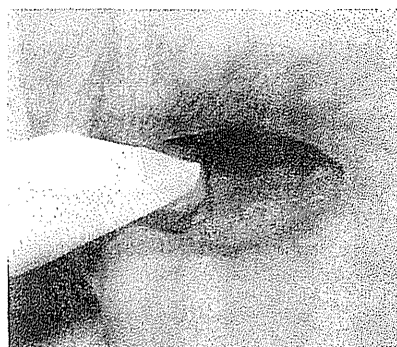


Fig. 1 The measurement position of oral mucosal moisture.

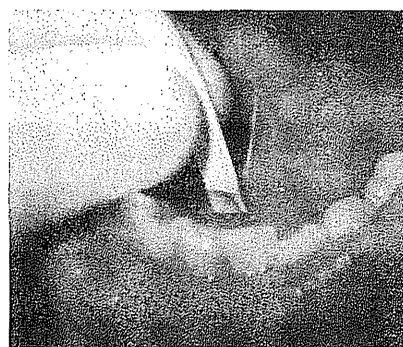


Fig. 2 The situation of saliva wetness test.

Table 1 The criteria of oral dryness in this study.

| Oral mucosal moisture measurement | | Saliva wetness test | |
|-----------------------------------|---------|---------------------|------------|
| Normal | Over 30 | Normal | Over 5 mm |
| Boundary | 29~30 | Slightly-dry | 3~5 mm |
| Slightly-dry | 27~29 | Moderate dry | Under 3 mm |
| Moderate dry | 25~27 | | |

sublingual dryness as shown in Fig. 2. The tester was placed on the mucosa of the sublingual area for 10 s and then evaluated by a half of a millimeter.²⁴⁾

Both of the oral dryness evaluations were based on previous studies and were carried out from 9 to 11 a.m.²¹⁻²⁴⁾ The criteria of evaluation are represented in Table 1. The above-mentioned oral dryness measurements were done at the onset of intervention, and after 3 and 5 months, respectively. In this study an oral care gel including a moisturizing ingredient (REFRECARE-H, EN Otsuka Pharmaceutical Co., Ltd., Tokyo) was used as the specimen. At the time of intervention onset, caregivers of the nursing home received a clear explanation regarding the use of the moisturizing oral care gel

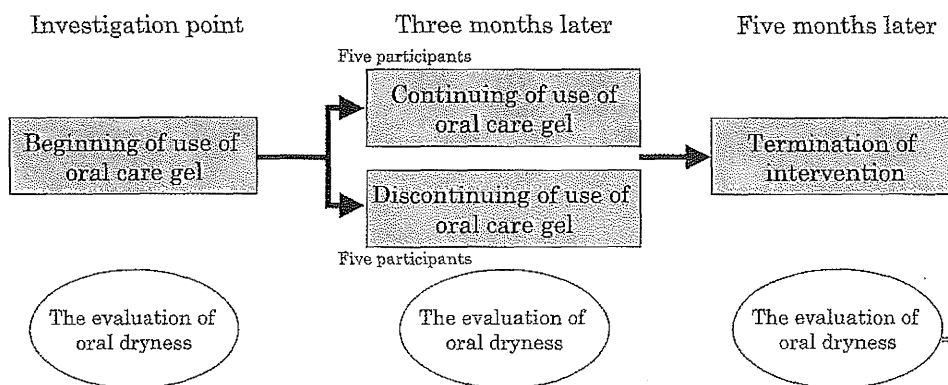


Fig. 3 Schema of the investigation program.

and oral health care method. The caregiver used a dollop of the dentifrice (approximately 1 cm in size) with a toothbrush and an oral swab twice daily (after breakfast and dinner).

In particular, the participants were told to avoid using an excess amount of the gel around the hard palate and the tongue. No one was allowed to use another brand of toothpaste and/or oral gel during the study period. In addition, during the investigation period and once a month, the caregivers underwent checks concerning the method of oral care by a dentist.

Three months later, the subjects were divided into 2 groups on the basis of the changes regarding their oral dryness. Five of the participants were classified to a group to continue using the dentifrice; caregivers were responsible for cleaning the oral cavities of the subjects. Alternatively, the remaining participants stopped using the dentifrice and continued to receive oral health care by the caregivers in a similar way. The classification was initiated to avoid a bias between the oral mucosal moisture measurement and saliva wetness test of the groups. A schema of this investigation program is shown in Fig. 3.

All the objects received the same measurement and test 2 months later, and the effects of the oral moisturizing gel were evaluated.

The results of the oral mucosal moisture measurement and the saliva wetness test were compared statistically by chi-squared test. Moreover, the result of oral mucosal moisture measurement and saliva wet test of continuing

and discontinuing groups among investigation point, 3 months later and 5 months later were compared by repeated measure ANOVA and Bonferroni-Dunn test were calculated by SPSS 14.0J (SPSS Japan Inc., Tokyo). The p-value of less than 0.05 was considered to indicate a significant difference for chi-squared test and two-way ANOVA for Bonferroni-Dunn test.

All experimental protocols were approved by the Ethics Committee of the School of Dentistry, Showa University (Approval Code: 2008-36).

Results

The buccal and tongue mucosal measurements of the pre and post intervention are shown in Fig. 4. No subject was evaluated normal in this measurement before using the moisturizing dentifrice. After the use of dentifrice for 3 months, 8 elderly were classified as normal in the buccal mucosal measurement and 6 were classified normal in the tongue mucosa measurement. Meanwhile, the number of boundary cases decreased markedly in the buccal mucosa measurement, and the participants classified into slightly-dry and moderate dry groups were shifted into boundary or normal groups in the tongue mucosa measurement. The results of the oral mucosal moisture test showed a statistical difference between pre and post intervention.

Figure 5 shows the results of the oral saliva wetness test before and after using the moisturizing dentifrice. Five participants were categorized as slightly-dry and the remaining were categorized as moderate. Three months

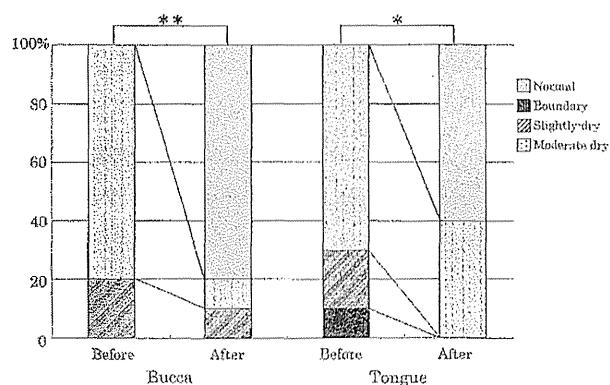


Fig. 4 Change of oral mucosal moisture measurement in 3 months. $**p<0.05$, $**p<0.01$ by chi-squared test.

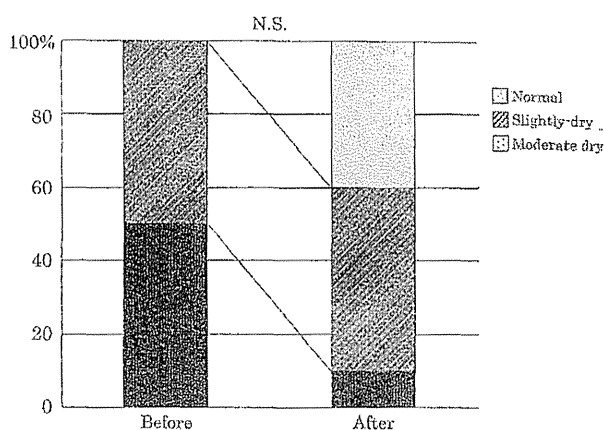


Fig. 5 Change of oral saliva wetness test in 3 months. N.S.: not significant by chi-squared test.

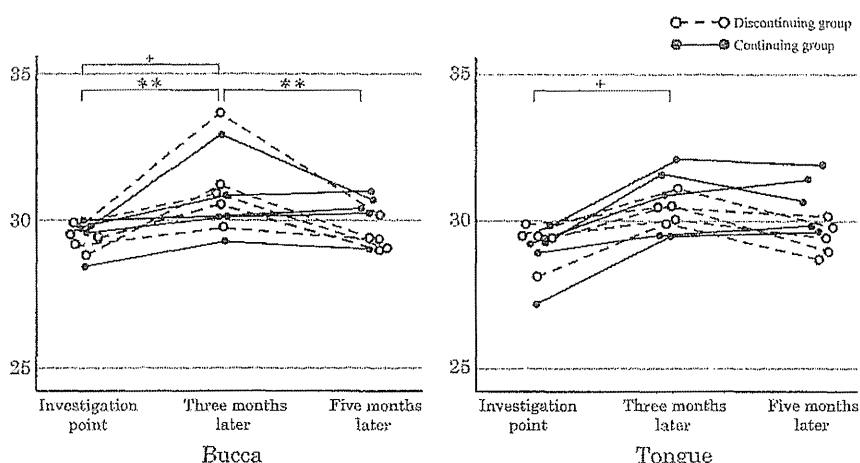


Fig. 6 Change of oral mucosal moisture measurement from beginning of invention to termination. $**p<0.003$ in discontinuing group, $+p<0.0167$ in continuing group, N.S.: not significant by Bonferroni-Dunn test.

later, 4 participants were evaluated normal and the number in the moderate group had decreased. However, there was no significant difference in the changes of the saliva wetness test.

The processes of the oral mucosal moisture measurement and the saliva wetness test of the discontinued and the continuing groups are indicated in Figs. 6 and 7. In the buccal mucosal measurement, all participants who had stopped using the dentifrice reverted to their prior oral conditions five months later. The results of the continuing group showed no significant change in the term between 3 and 5 months; the measurement had increased slightly except for 1 participant whose measurement result had decreased over a period of 2 months. Both results of buccal and tongue mucosa did

not show statistic difference between continuing and discontinuing groups ($F=0.32$ and 0.33 , $p=0.46$ and 0.57 , and respectively). However, the result of buccal mucosa showed statistic difference between investigation point and 3 months later and 3 months later and 5 months later in discontinuing group ($p<0.01$). Similarly, the results of buccal and tongue mucosa in continuing group showed statistical changes between the investigation point and 3 months later ($p<0.05$). The changes of the saliva wetness test indicated similar tendency as that of the oral mucosal moisture measurement; on the other hand, there was no significant difference in both of discontinuing and continuing group.

The degree of wetness of 3 participants diminished after stopping the use of the dentifrice, although 1

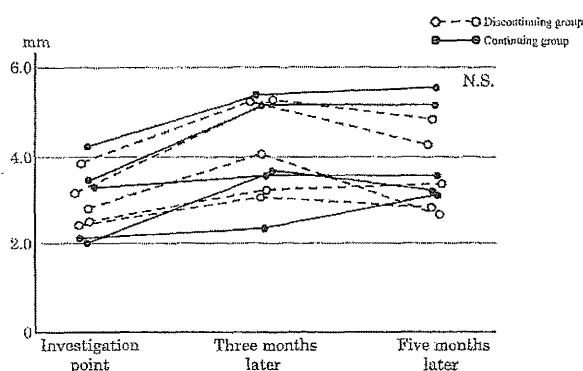


Fig. 7 Change of saliva wetness test from beginning of investigation to termination.

N.S.: not significant by Bonferroni-Dunn test.

participant showed no variation. The results of the remaining 1 participant represented a mild increase of oral wetness over the 2 months. Three subjects in the continuing group showed a slight increase of oral wetness from 3 to 5 months later; however, there was almost no variation for the 2 months. All the comparisons between counting and discounting group and among investigation point, 3 months later and 5 months later did not show any significant differences.

Discussion

In this study changes of oral dryness in elderly females were analyzed, and the effects of oral health care with a moisturizing dentifrice were examined for 5 months. A past researches indicate that a dentifrice with moisturizing agents could ease some subjective and/of objective complaints.¹⁸⁾ Additionally, it has been shown that moisturizing the oral cavity might influence the general physical condition, including fever and amount of food intake.²⁰⁾ The results in this study showed objectively that a moisturizing dentifrice could improve the dryness of the oral mucosa. The oral mucosal moisture measurement used in this study determines the electrostatic capacity to evaluate the amount of water in the epithelium of the mucous membrane.²⁰⁾ Moreover, for people with xerostomia, the sublingual saliva wetness test had a high correlation with spitting method, a way to estimate saliva secretion.²⁴⁾ Consequently, it was considered that these evaluations could accurately measure the amount of

moisture in the oral mucosa.

Some studies have revealed that corneocyte intercellular lipids and skin surface lipids play an important role in water conservation mechanisms of the human skin.^{25, 26)} In the oral mucosa little is known regarding the mechanisms of water-holding properties of hyaluronic acid, which has a primary moisturizing role in submucosal and subcutaneous tissues.²⁷⁻²⁹⁾ In females with dry mouth, the level of hyaluronic acid in saliva is markedly lower than that of a normal female group.²⁷⁾ The dentifrice used in this study contains sodium hyaluronate, glycerin and propylene glycol as moistening agents. Our results show that these moisturizing agents in the oral submucosal area promoted a constant level of moisture. The oral moisturizing conditions of the participants were improved for 3 months after beginning oral health care with the dentifrice. However, the beneficial effect for easing oral dryness was temporary and did not last long when the participants stopped using the dentifrice. Moreover, to improve the dryness on the tongue mucosa was harder than the improvement of buccal mucosa unless the dentifrice was used for a long time. This result has also been reported regarding other oral moisturizing products including some kinds of artificial saliva and oral moisturizing liquids.^{16, 17)}

Additionally, a dentifrice available for diminishing oral dryness and soreness of patients with oral cancer also did have a long-lasting effect.^{19, 30)} Some research has shown that oral dryness and xerostomia of the elderly are caused by medication, aging and oral dysfunction.^{12, 13)} In recent years it has become well known that numerous medications might result in dry mouth and oligosialia as adverse drug reactions on one level or another.³¹⁻³³⁾ All participants of this study took daily medications that could bring on oligosialia, and it was, therefore difficult to increase the amount of saliva secretion. Consequently, these results showed that the oral submucosal condition could not be significantly changed even with the use of moisturizing agents.

From these findings, our study suggests that daily oral health care with a dentifrice containing moisturizing

agents can improve the oral mucosal wetness and submucosal moisture condition of the elderly. However, the effect of the moisturizing dentifrice continues as long as the oral moisturizing gel is used and sublingual dryness can be easy to fail to improve.

Multidirectional intervention, including oral health care and the control of drug administration and corresponding primary diseases, may be needed to improve oral dryness in the elderly.

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臨床報告

昭和大学藤が丘病院および藤が丘リハビリテーション病院における口腔ケアセンター活動とその効果について

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要旨：昭和大学藤が丘病院における昭和大学口腔ケアセンター活動は、2008年9月の心臓血管外科における口腔ケアクリニカルパスの運用から本格的に開始され、現在は全病棟を対象とした活動を行っている。同様に、藤が丘リハビリテーション病院では、2009年12月に口腔ケア回診のトライアルを開始し、現在では全病棟の入院患者を対象として活動を継続している。本研究では、両施設において口腔ケアセンターが2008年度から2010年度までの期間に介入した患者250名を対象に、口腔ケアクリニカルパス適用群、非適用群、リハビリテーション病院群の3群に分けて臨床検討を行った。いずれの群も女性より男性の割合が高かった。平均年齢は、リハビリテーション病院群が最も高く、次いでパス適用群、非パス適用群の順であった。平均介入回数は、いずれの群も3回前後であった。非パス適用群の主疾患は循環器系疾患だけでなく、悪性腫瘍、呼吸器疾患、脳血管疾患と多岐にわたっていた。藤が丘病院のIntensive Care Unit (ICU)における人工呼吸器関連肺炎 (VAP) サーベイランスデータのVAP発生率は、口腔ケアセンター活動が開始された2008年度以降減少していた。藤が丘病院と藤が丘リハビリテーション病院は、急性期医療と統合的リハビリテーション専門医療を担う横浜市北部地域の中核的医療施設である。当口腔ケアセンターの特徴は、異なる医療サービスを展開する両施設で活動することにある。口腔ケア回診対象者数は、年々増加しており、今後は退院後の患者のフォローアップをより強化するため、地域医療機関との連携を進める必要があると考えられた。

近年、誤嚥性肺炎をはじめとした呼吸器感染症の予防対策として口腔ケアの有用性が明らかとなってきている^{1,2)}。ICUや術前期における口腔ケアが、VAP予防の観点から^{3,4)}積極的に行われるようになり、その効果について、さまざまな報告がなされている^{5~12)}。

本学では2008年4月に口腔ケアセンターを開設し、附属病院において多職種連携による口腔ケアの標準化を開始している。昭和大学藤が丘病院（以下、本院）における口腔ケアセンター活動は、2008年9月より循環器内科および心臓血管外科の協力のもと、心臓血管外科の開心術クリニカルパスと連携した口腔ケアクリニカルパス (Fig. 1) を導入することから開始された。これにより、病棟と歯科室および各職種が連携を図り、術前・術後を通じて標準化された口腔ケアが提供されることが活動の特徴として挙げられる。術前の口腔ケアアセスメント用

紙を Fig. 2 に示す。2009年4月には、全病棟介入が開始となり、非パス適用患者に対しても、口腔ケアセンタースタッフによる週1回の口腔ケア定期回診または歯科室スタッフによる口腔ケア介入が行われるようになった。また、藤が丘リハビリテーション病院（以下、リハ病院）では、2009年12月に口腔ケア介入のトライアルが開始され、2010年10月に、月1回の口腔ケア定期回診が開始されている。

そこで本調査では、これまでの口腔ケアセンター活動の実態を把握し、今後の課題を抽出するために検討を行った。

対象と方法

対象は、口腔ケアセンターの活動が本格開始となった2008年9月から2011年3月までの間に、病棟の医師

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Clinical Path 心臓血管口腔ケア()

| 項目 | 問題点 | | | |
|--------|---|---|--|--|
| | 非人工呼吸器別室性肺炎 | 呼吸器感染症予防ができる | 達成/未達成 | 達成/未達成 |
| 口腔ケア | <p>歯科受診・口腔内評価 (プラン作成) (済・未)</p> <p>○舌の評価 (1)乾燥状態 0度:正常 1度:唾液の粘性が亢進している 2度:唾液中に細かい唾液の泡がみられる 3度:舌の上にほとんど唾液がなく乾燥状態 (粘本:2000)</p> <p>○舌苔の評価 舌苔 (無・少量・中等度・多量) (白色・青色)</p> <p>○頬粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔前庭の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔・咽頭粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○痰の付着状態 痰の付着状態 (なし、ややあり、多量)</p> <p>○口臭の評価 口臭 (有・無)</p> <p>○口腔ケアの評価 患者の有無 (上のみ・下のみ・上下・無) 義歯の有無 (いつも・時々・使用しない・食事時のみ) 義歯の汚れ (本人・病棟) 義歯の汚れ (有・無) (部位:)</p> <p>○口腔内観察 (抗菌薬) (消毒薬) (内分泌) (向精神薬)</p> | <p>○舌の評価 (1)乾燥状態 0度:正常 1度:唾液の粘性が亢進している 2度:唾液中に細かい唾液の泡がみられる 3度:舌の上にほとんど唾液がなく乾燥状態 (粘本:2000)</p> <p>○舌苔の評価 舌苔 (無・少量・中等度・多量) (白色・青色)</p> <p>○頬粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔前庭の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔・咽頭粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○痰の付着状態 痰の付着状態 (なし、ややあり、多量)</p> <p>○口臭の評価 口臭 (有・無)</p> <p>○義歯の評価 患者の有無 (上のみ・下のみ・上下・無) 義歯の有無 (いつも・時々・使用しない・食事時のみ) 義歯の汚れ (有・無) (部位:)</p> <p>○口腔内観察 (変更有・変更無) (抗菌薬) (消毒薬) (内分泌) (向精神薬)</p> | <p>○カフ圧チェック ○舌の評価 (1)乾燥状態 0度:正常 1度:唾液の粘性が亢進している 2度:唾液中に細かい唾液の泡がみられる 3度:舌の上にほとんど唾液がなく乾燥状態 (粘本:2000)</p> <p>○舌苔の評価 舌苔 (無・少量・中等度・多量) (白色・青色)</p> <p>○頬粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔前庭の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔・咽頭粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○痰の付着状態 痰の付着状態 (なし、ややあり、多量)</p> <p>○口臭の評価 口臭 (有・無)</p> <p>○義歯の評価 患者の有無 (上のみ・下のみ・上下・無) 義歯の有無 (いつも・時々・使用しない・食事時のみ) 義歯の汚れ (有・無) (部位:)</p> <p>○口腔内観察 (変更有・変更無) (抗菌薬) (消毒薬) (内分泌) (向精神薬)</p> | <p>○カフ圧チェック ○舌の評価 (1)乾燥状態 0度:正常 1度:唾液の粘性が亢進している 2度:唾液中に細かい唾液の泡がみられる 3度:舌の上にほとんど唾液がなく乾燥状態 (粘本:2000)</p> <p>○舌苔の評価 舌苔 (無・少量・中等度・多量) (白色・青色)</p> <p>○頬粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔前庭の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○口腔・咽頭粘膜の評価 口腔粘膜の炎症 (健康・軽度・中等度・重度)</p> <p>○痰の付着状態 痰の付着状態 (なし、ややあり、多量)</p> <p>○口臭の評価 口臭 (有・無)</p> <p>○義歯の評価 患者の有無 (上のみ・下のみ・上下・無) 義歯の有無 (いつも・時々・使用しない・食事時のみ) 義歯の汚れ (有・無) (部位:)</p> <p>○口腔内観察 (変更有・変更無) (抗菌薬) (消毒薬) (内分泌) (向精神薬)</p> |
| 非人工呼吸器 | <p>○患者後口腔ケア (歯磨き剤・フラケフォーム)</p> <p>○プランに基づく口腔清掃 ・使用器具:歯ブラシ、スポンジブラシ、ガーゼ、紙コップ (タフトブラシ、歯間ブラシ、舌ブラシ) ・使用薬剤:0.025%ジアトール水(塩化ベンザルコニウム)、口腔粘膜湿潤剤 1 口腔・角角に乾燥がある場合は口腔粘膜湿潤剤を塗布 2 口腔内診察(歯式、動脈、出血、乾燥) 3 必要に応じて吸引 4 口腔ケアの実施 使用材料の選択→口腔内に口腔粘膜湿潤剤を塗布→口腔清掃 5 スポンジブラシにて口腔内の水分、その他の付着物の除去 6 スポンジブラシで口腔粘膜湿潤剤を塗布 7 必要に応じて吸引</p> | <p>○プランに基づく口腔清掃 ・使用器具:歯ブラシ、スポンジブラシ、ガーゼ、紙コップ (タフトブラシ、歯間ブラシ、舌ブラシ) ・使用薬剤:0.025%ジアトール水(塩化ベンザルコニウム)、口腔粘膜湿潤剤 1 口腔・角角に乾燥がある場合は口腔粘膜湿潤剤を塗布 2 口腔内診察(歯式、動脈、出血、乾燥) 3 必要に応じて吸引 4 吸引 5 口腔ケアの実施 使用材料の選択→患者チューブを固定しているチューブを介して移動可能な状態にする 7 バイトブロックを移動させながら口腔清掃を実施 8 スポンジブラシ、歯ブラシで口腔内の水分その他の付着物の除去 9 スポンジブラシで口腔粘膜湿潤剤の塗布 10 吸引 11 バイトブロック、押管チューブの固定、カフ圧を戻す</p> | <p>○プランに基づく口腔清掃 ・使用器具:歯ブラシ、スポンジブラシ、ガーゼ、紙コップ (タフトブラシ、歯間ブラシ、舌ブラシ) ・使用薬剤:0.025%ジアトール水(塩化ベンザルコニウム)、口腔粘膜湿潤剤 1 口腔・角角に乾燥がある場合は口腔粘膜湿潤剤を塗布 2 口腔内診察(歯式、動脈、出血、乾燥) 3 必要に応じて吸引 4 吸引 5 口腔ケアの実施 使用材料の選択→口腔内に口腔粘膜湿潤剤を塗布→口腔清掃 6 スポンジブラシにて口腔内の水分、その他の付着物の除去 7 必要に応じて吸引</p> | <p>△患者マスク使用中の口腔ケア ○プランに基づく口腔清掃の補助 ・使用器具:歯ブラシ、スポンジブラシ、ガーゼ、紙コップ (タフトブラシ、歯間ブラシ、舌ブラシ) ・使用薬剤:0.025%ジアトール水(塩化ベンザルコニウム)、口腔粘膜湿潤剤 1 口腔・角角に乾燥がある場合は口腔粘膜湿潤剤を塗布 2 口腔内診察(歯式、動脈、出血、乾燥) 3 必要に応じて吸引 4 口腔ケアの実施 使用材料の選択→口腔内に口腔粘膜湿潤剤を塗布→口腔清掃 5 スポンジブラシにて口腔内の水分、その他の付着物の除去 6 スポンジブラシで口腔粘膜湿潤剤を塗布 7 必要に応じて吸引</p> |
| 人工呼吸器 | <p>○毎食後、本人によるケア 洗口剤によるケア、または患者自身による歯ブラシ等によるブラッシング ・使用器具:歯ブラシ ・使用薬剤:歯磨き剤、歯間ブラシ ・使用薬剤:歯磨き剤 手技:日常の患者自身の方法または指導した方法。</p> | <p>○毎食後、本人によるケア 洗口剤によるケア、または患者自身による歯ブラシ等によるブラッシング ・使用器具:歯ブラシ ・使用薬剤:歯磨き剤、歯間ブラシ ・使用薬剤:歯磨き剤 手技:日常の患者自身の方法または指導した方法。</p> | <p>○毎食後、本人によるケア 洗口剤によるケア、または患者自身による歯ブラシ等によるブラッシング ・使用器具:歯ブラシ ・使用薬剤:歯磨き剤、歯間ブラシ ・使用薬剤:歯磨き剤 手技:日常の患者自身の方法または指導した方法。</p> | <p>○毎食後、本人によるケア 洗口剤によるケア、または患者自身による歯ブラシ等によるブラッシング ・使用器具:歯ブラシ ・使用薬剤:歯磨き剤、歯間ブラシ ・使用薬剤:歯磨き剤 手技:日常の患者自身の方法または指導した方法。</p> |
| 評価 | <p>△患者の指導 (1)歯ブラシの握り方(握りに対する角度)に気を付けましょう。 (2)歯ブラシを強く磨かず、やさしくしましょう。 (3)歯ブラシを細かく動かしましょう。 (4)歯ブラシは1か所20回以上動かしましょう。 (5)歯ブラシはエンピツを持つように握りましょう。 (6)順番を決めて、みがゆきましょう。 (7)その他</p> | <p>△患者の指導 (1)歯ブラシの握り方(握りに対する角度)に気を付けましょう。 (2)歯ブラシを強く磨かず、やさしくしましょう。 (3)歯ブラシを細かく動かしましょう。 (4)歯ブラシは1か所20回以上動かしましょう。 (5)歯ブラシはエンピツを持つように握りましょう。 (6)順番を決めて、みがゆきましょう。 (7)その他</p> | <p>△患者の指導 (1)歯ブラシの握り方(握りに対する角度)に気を付けましょう。 (2)歯ブラシを強く磨かず、やさしくしましょう。 (3)歯ブラシを細かく動かしましょう。 (4)歯ブラシは1か所20回以上動かしましょう。 (5)歯ブラシはエンピツを持つように握りましょう。 (6)順番を決めて、みがゆきましょう。 (7)その他</p> | <p>△患者の指導 (1)歯ブラシの握り方(握りに対する角度)に気を付けましょう。 (2)歯ブラシを強く磨かず、やさしくしましょう。 (3)歯ブラシを細かく動かしましょう。 (4)歯ブラシは1か所20回以上動かしましょう。 (5)歯ブラシはエンピツを持つように握りましょう。 (6)順番を決めて、みがゆきましょう。 (7)その他</p> |
| 評価項目 | <p>達成状況</p> <p>達成率</p> <p>達成率</p> | <p>達成状況</p> <p>達成率</p> <p>達成率</p> | <p>達成状況</p> <p>達成率</p> <p>達成率</p> | <p>達成状況</p> <p>達成率</p> <p>達成率</p> |

Fig. 1 Clinical pathway for oral health care in cardiovascular surgery.