

### Oral Care of a Patient with Amyotrophic Lateral Sclerosis (ALS)

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#### Abstract

Amyotrophic Lateral Sclerosis (ALS) is a Motor Neuron Disease (MND). It is a progressive motor nerve atrophy which will cause progressive neuromuscular atrophy and disability. The limbs of patients seem to be frozen. They cannot engage in normal activities, and can only turn their eyeballs. Therefore, such patients are commonly called “gradually frozen people.” ALS is one of the 5 major incurable diseases in the world. The cause of ALS is still uncertain. This study intends to introduce the oral problems caused by ALS in the patient, as well as how to use oral care approaches to achieve the maintenance of oral health of patients with ALS and alleviate the infections and discomforts caused by oropharyngeal dysfunction in such patients.

**Keywords:** Amyotrophic Lateral Sclerosis (ALS); Dysphagia; Trismus

#### Introduction

Amyotrophic Lateral Sclerosis (ALS) is a progressive neurodegenerative disease of Upper Motor Neuron (UMN) and Lower Motor Neuron (LMN). The initial signs may vary with individuals. The affected individuals experience typical signs in limbs (disability in arms and legs) and medulla oblongata (dysarthria and dysphagia) [1]. ALS is featured by the loss of upper and lower motor neurons, including primary motor cortex, brain stem and spinal cord [2]. Dysphagia is oropharyngeal muscle weakness caused by dysfunction and will further lead to the risks of aspiration pneumonia, malnutrition, and dehydration. Dysphagia is the most significant clinical change and problem of oropharynx in patients with ALS [3]. Trismus is also an oral problem that perplexes patients with ALS, and is usually associated with masticatory muscle. Trismus will lead to limited mouth opening and failure to open mouth. When the mouth opening is less than 18-20 mm, it is difficult for patients to eat anything. After a long period of time, it will be difficult to maintain oral health and may easily cause caries or periodontal disease [4]. The mouth opening

of the patient was less than 20mm, so it was quite challenging to perform oral cleaning. Relevant studies showed that, patients with ALS tend to experience tongue bleeding, broken teeth, and loosening of dentures and braces due to trismus-induced excessive force and dentition dislocation. Moreover, ALS will lead to difficulty in opening and closing of mouth. Therefore, it is difficult for patients to maintain oral hygiene and they may experience decreased appetite [5].

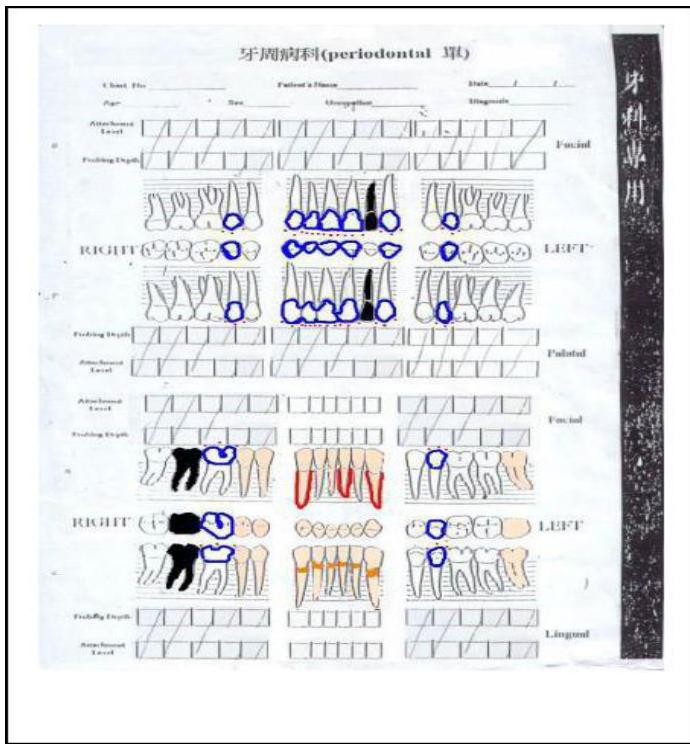
#### Introduction to the Case

The patient was an unmarried woman at the age of 43. In 2006, the patient started to experience the onset from hands (endings). To date, the patient has suffered from ALS for 9 years. The patient cannot talk now and can only use eye-controlled computer as the tool for external communication. Moreover, 3 foreign caregivers accompany her and take care of her at any time.

The oral condition of the patient is as follows (Figure 1):

- Edentulous teeth (**black**) are (22) (47)
- Teeth with Tartar accumulation at tooth neck on the tongue side (**orange**) are (31) (32) (33) (41) (42) (43).

- Teeth with severe root exposure and gingival recession (**red**) are (31) (33) (43), which may affect the absorption of alveolar bone.
- Natural teeth (**pink**) are (31) (32) (33) (38) (41) (42) (43) (44) (45) suffer from severe caries; some of them are merely root.
- Teeth with crown or dental bridge denture (**blue**) are (11) (12) (13) (15) (21) (23) (25) (35) (46) suffer from severe gingival swelling and inflammation, and will bleed as touched by swab.



**Figure 1:** Oral Examination Form of Patient.

The patient secreted a large amount of saliva, and experienced salivation. Because the patient did not take saliva inhibitor, there was no need to place saliva tube of saliva sucking device in her mouth to suck extra saliva. The patient underwent Percutaneous Endoscopic Gastrostomy (PEG) in 2012, so took food via gastrostomy. The staple was mainly full fluid food (RESOURCE liquid drink). In 2013, in order to resolve the problems of severe dysphagia, sputum suction, and respiration of patient, the patient underwent tracheostomy placement. In addition, noninvasive Bilevel Positive Airway Pressure (BiPAP) was used to connect to tracheostomy tube.

In the same year, the patient started to experience trismus. At dental clinic, a dentist tried to use steel mouth gag to open her mouth. However, her mouth still could not be successfully opened. When more pressure was put on her mouth, the patient immediately reflected the facial expression of discomfort and used

eye-controlled computer to reflect pain in temporomandibular joint. In the end, the dentist could only use plastic mouth gag to open her cheeks to clean and treat cheek side and lip side.

## Handling Methods

To maintain good oral health, the most important approach is to implement oral care.

The oral care methods for people with special needs are proposed as follows:

**To choose appropriate toothbrush:** Toothbrush should be suitable for oral structure. The bristles should be able to cover the surface of teeth without surpassing gum. A toothbrush should cover no more than 3 teeth to avoid damaging soft tissues. In addition, it is preferable to choose to use soft -bristled toothbrush and avoid using toothbrush with larger head or stiff bristle which may easily lead to oral mucosal injury, bleeding, and inflammation.

**Accurate tooth-brushing method:** Bass method of brushing is the most effective tooth-brushing method. The number of times of brushing is not important, and accurate and effective brushing is more important than anything else.

**Accurate use of floss:** Tooth-brushing is mainly to clean the food residues on gums. Floss should be used to reach the gap between teeth where there are food residues. In terms of the choice of floss, waxed dental floss is relatively easy-to-use. When flossing skill is more mature, non-waxed dental floss can be used. Moreover, floss is not an appropriate tooth cleaning tool and may easily damage gums. It is preferable to avoid using floss. Dental floss stick is the replacement of floss when one has not learned to use floss. Similarly, dental floss stick may damage gums. So, it is advised not to use dental floss stick.

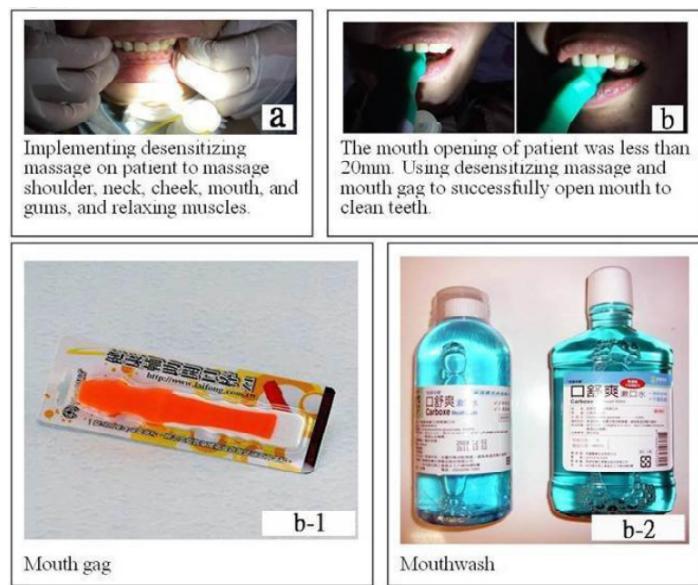
**Use of mouthwash containing 0.12% chlorhexidine:** Because there are many bacteria in mouth, proper use of mouthwash containing chlorhexidine can reduce potentially pathogenic bacterial colonies, as well as reduce bacteria's ability to produce proteolytic enzyme, to reduce damage to periodontal tissues. Usage: dilute mouthwash with water at a ratio of 1:1, use swab or gauze to wrap fingers, use water to rinse mouth first, and then dip the swab with mouthwash to clean the mouth and surface of every tooth of patient. To patients with ALS, excessive saliva is one of the factors confusing patients with ALS and affecting quality of life. When excessive salivation is severe, saliva inhibitors have to be taken to reduce salivation. Mouthwash for Xerostomia is a product helping supplement saliva. It contains patented LP3 enzyme which can effectively protect oral environment and alleviate xerostomia. Such mouthwash is used in patients who experience reduced saliva or complete loss of saliva and cannot maintain mouth moisture, instead of patients with ALS. Therefore, during the choice of mouthwash, it is necessary to pay particular attention to the efficacy and applicable objects to prevent inappropriate use. Patients with ALS are advised to choose general mouthwash containing chlorhexidine and fluoride without alcohol, as well as follow the oral care methods proposed for patients with special

needs in this study. In this way, patients' oral hygiene and dental health can be maintained.

**Implementation of desensitizing massage:** Shoulder, neck, cheek, lip, and gum massage sticks can be used to relax muscles and reduce pressure to facilitate mouth opening.

**Use of assistive mouth gag:** The material of gag specifically for patients with special needs is edible flexible TRP gel, which will do no harm to jaw. Place gag in mouth in parallel with molar teeth and then erect it. The purpose of mouth opening can be achieved.

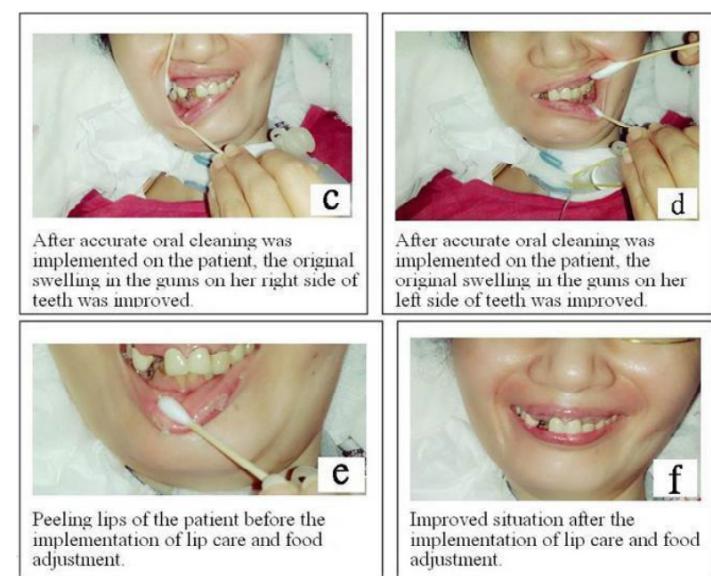
Because the patient suffered from severe trismus, it is impossible to clean tongue side, biting surface, and proximal surface of abutment surface. Therefore, the author used the oral care methods for patients with special needs mentioned above clean the patient's mouth in person during the care period. For mouth opening, the author used assistive mouth gag specifically for patients with special needs to open mouth. In the first time, the patient's mouth could not be successfully opened. Afterwards, the author implemented desensitizing massage and used language to pacify and encourage patient (Figure 2a). The author also placed mouth gag specifically for dental clinic for patients with physical and psychological disabilities in parallel with molar teeth, and then erected it. Finally, the patient's mouth was successfully opened (Figures 2b and 2b-1). After the mouth was opened, the author dipped swab with mouthwash to clean the tongue side, biting surface, and adjacent surface (proximal surface), and used toothbrush to brush the patient's teeth (Figure 2b-2). In the end, the author cleaned cheek side, lip side, and abutment surface (distal surface), and eventually completed whole mouth cleaning successfully and observed dental condition to achieve the purpose of oral care.



**Figures 2(a-b, b1,b2).**

Afterwards, the author visited the patient at home to implement oral care methods for patients with special needs, and taught family members and foreign caregivers to regularly implement accurate oral cleaning for the patient. The patient's originally severe swelling and inflammation were gradually improved (Figures 2c and 2d).

Because the patient suffered from long-term malnutrition, the author found that there was significantly severe peeling in the patient's lip (Figure 2e). Lack of vitamin B<sub>2</sub> may lead to lip peeling and skin rash. Therefore, there is a need to frequently supplement vitamin B with food or nourishments. In addition to implementing oral care methods in the patient, the author also implemented lip nursing for the patient and taught family members and foreign caregivers. The methods were: use hot towel for fomentation of lips for 3-5 minutes, use soft brush to wipe away dead skin on lips, and rub moisturizing lip balm containing vitamin E for at least once a day. Moreover, the author also advised family members to provide the patient with milk, egg, beans, and vegetables. After lip nursing and dietary adjustments, the lip peeling of the patient was gradually improved, and the patient was willing to smile (Figure 2f).



**Figures 2(c-f).**

To patients with special needs, in addition to taking care of their physical health, as a matter of fact, it is also necessary to pay more attention to their oral health because it is closely related to comfort and quality of life.

## Discussion

During the onset of ALS, the patient started to experience bulbar muscular paralysis. The patient already experienced the signs of dysphagia and difficulty in speaking when the movements of her limbs are fine. During eating, the patient tended to experience

food residues stuck in corners of mouth. In addition, because the patient suffered from hypoesthesia, food residues tended to slip into throat and trachea along with saliva when she lied down. Besides, the patient also experienced excessive secretion of sputum. Therefore, she underwent tracheostomy surgery to improve airway clearance efficiency, sputum suction, and quality of life, which is beneficial to patients with ALS. According to clinical experiences, dysphagia is one of the most severe complications experienced by patients with ALS. The average survival time after onset was 2-5 years. Approximately 25% of the patients with ALS experience signs in medulla oblongata, dysphagia, and dysarthria, and eventually experience cranial nerve symptoms, as well as respiratory dysfunction. The patient in this study experienced all of the aforementioned complications. However, dysphagia will lead to malnutrition, dehydration, and aspiration pneumonia of patients [6]. The patient experienced tongue and lip bleeding, caries, broken teeth, loosening of dentures, difficulty in mouth opening, difficulty in mouth cleaning, and reduction of appetite due to trismus-induced excessive force and dentition dislocation. Relevant studies found that, long-term trismus may also induce temporomandibular joint problems, degenerative arthritis, joint inflammation, and pain. Failure to receive treatment will lead to permanent problems, such as temporomandibular joint adhesions [4]. Oral care principles for prevention of trismus are:

(1) stretching neck in a continuous and slow manner to slightly tighten muscles; however, in principle, it is necessary to avoid pain; (2) using spatula or finger to help open mouth; (3) measuring the distance between upper incisors and lower incisors every day to observe progress; (4) using hot towel for fomentation for 15 minutes in every one hour to reduce discomfort in case of muscle aches [5].

Moreover, excessive saliva was also one of the factors confusing the patient a lot and affecting her quality of life. Relevant studies showed that, ALS is a disease that will do damage to all the voluntary muscles. At the early stage of onset, patients experience signs in medulla oblongata. Therefore, some patients experience salivation (excessive saliva), which may be a severe issue [7]. In terms of saliva, the amount of saliva secreted daily is 0.5-1 liters, which causes problems and inconvenience to patients, especially the cleaning of saliva, dysphagia, and salivation [8]. For the excessive saliva of patients with ALS, some studies indicated

that radiotherapy can be used to effectively reduce salivation [9]. Professionals may perform management and decision-making for dysphagia and salivation of patients with ALS to improve their quality of life [10].

Although ALS is one of the 5 major incurable diseases in the world, it is hoped that this study can help maintain oral health of patients with ALS, as well as alleviate the oral and dental diseases and discomforts caused by oropharyngeal dysfunction through the oral care methods proposed for patients with special needs.

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