●Home Visiting Dental Treatment Manual

Abstract

With the aim of indicating the degree of recommendation that supports clinical decision-making in home visiting dentistry based on evidence as much as possible, 12 groups are organized, and each group drafted questions (Clinical Question, CQ). After scrutinizing the collected papers, they examined whether CQ proposal was appropriate, revised it as necessary, and confirmed the CQ. For the confirmed CQ, a home visiting dentistry manual was prepared by quoting evidence (references) and recommendation and explanatory sentences were included. In this manual, one case report was presented for each chapter according to CQ. The manual is also used by dentists, dental hygienists who are involved in dental home visits, and educators. In addition, it is possible to utilize all occupations, patients and patient families involved in visiting medical care.

Acknowledgement

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Table of Contents

1 through 9 are in CQ style. 10 and 11 are in Q & A style. 12 shows the investigation results.

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●Chapter 1: Mastication and swallowing

[Chapter 1: Evaluation for mastication and swallowing, Table of contents]

When dentists intervene for patients at home, not only the line of sight for prosthetic treatment or periodontal disease treatment, but also prevention of aspiration pneumonia and safe intake of the necessary nutrition must also be taken into consideration. In addition, shift to oral intake must be considered if the swallowing function is maintained even if the patient does not currently have oral intake, or if the effects of training are observed even though the function had been poor before, and improvement in QOL is an important issue even for cases that are incapable of sufficient oral intake due to various reasons.

While swallowing function test has come under the spotlight in recent years in ensuring safe oral intake, masticatory functions are also important ones that need to be evaluated at the same time. This section therefore explains the following questions that are often faced during evaluation of swallowing and mastication and in the course of matters related to them:

An actual case example report on a dysphagia patient handled in visiting care is also described below. Please use it for reference while also checking the corresponding CQ.

CQ1-1 What types of patients have higher risks of suffocation?

CQ1-1	What types of patients have higher risks of suffocation?
Recommendation	While there are risks of suffocation in patients with pharyngeal stage disorders, risks of suffocation should be suspected if an anticipatory stage/preparatory stage/oral stage disorder is strong even if the patient does not have a pharyngeal stage disorder.
Explanation	[Background] Many patients of visiting care present reduced ADL and swallowing functions compared to outpatients. In addition, patients with risks of suffocation often have disorders in anticipatory stage (stage where food is recognized), preparatory stage (stage where food is chewed), or oral stage (stage where the chewed food is formed into a bolus and sent to the pharynx)[1,2]. Fig. 1 shows the types of food which have been reported in particular for cases of suffocation in elderly people. While it is natural that things like rice cake and bread which tend to reach the pharynx as a bulk come to the top, even rice porridge and liquid food have been named the causes of suffocation. Furthermore, some reported that reduced cognitive functions, self-reliance in eating, and loss of occlusion in the posterior teeth can be risk factors of suffocation[3]. [Explanation] Evaluation of suffocation risks becomes important if there are reduced swallowing functions in particular during the pharyngeal stage due to diseases, deterioration in ADL and so forth, or if there have been episodes of suffocation. There are risks of suffocation even if the patient does not have a pharyngeal stage disorder, and disorders in anticipatory, preparatory or oral stage further modify the risks. There are five possible measures to be taken for patients with risks of suffocation as described below:

1. The types of diet that suit the masticatory functions including the number of remaining teeth and the number of occlusal teeth, oral functions including crushing with the tongue, and swallowing functions with little aspiration or remaining food (bite size food, chopped food with thickening, chopped food, soft food, paste food, etc.) should be proposed. If it is impossible to solve the problem only by the type of diet, methods to avoid remaining food and aspiration should be searched, and compensation methods such as giving thickened drink or jelly beverage alternately should be instructed.
2. Disorders that can cause dysphagia (with special caution on progressive diseases) shall be grasped to give instructions that are appropriate to the changing conditions of the patient, including methods to reduce the meal time, selection of the appropriate time if the arousal level fluctuates during the day, and giving instructions to suit the level during the period with lowest arousal, if the patient does not have endurance. In the case of progressive diseases such as ALS, it is important to quickly adapt to the changes in the patient's conditions, and cooperation with not only the patient and their family but also people in other occupations will be important in grasping the conditions. Instructions should also be given on the methods for handling in case of suffocation (Heimlich maneuver, back tapping, etc.).
3. Restoration of occlusion support should also be attempted through periodontal disease treatment, prosthetic treatment and so forth.
4. Instructions should be given on methods of food intake, for example reducing the amount for one bite, selection of tableware, appropriate pacing for the meal, speaking to the patient properly, giving meals in small servings and so forth.
5. Instructions should be given to the family and care givers on watching the patients who eat by themselves, pacing

	when helping eat, adjustment of the amount of one bite and so forth. Measures in case of suffocation should be instructed to the family and care givers. If the patient has had episodes of suffocation in the past and was successfully rescued by some method, the method should be noted. If there are test results as shown in Fig. 2, risks of suffocation should be considered.
References	1) Feinberg MJ. Radiographic techniques and interpretation of abnormal swallowing in adult and elderly patients. Dysphagia. 1993;8(4):356-358. 2) Kikutani T, Tamura F, Tohara T, Takahashi N, Yaegaki K. Tooth loss as risk factor for foreign-body asphyxiation in nursing-home patients. Arch Gerontol Geriatr. 2012;54(3):431-435. 3) https://www.mhlw.go.jp/topics/bukyoku/iyaku/syoku-anzen/chissoku/dl/04.pdf
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

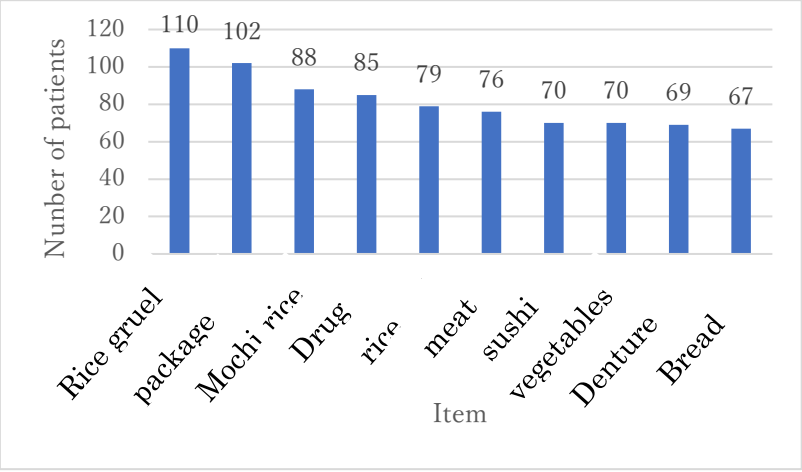


Fig. 1: 10 top food products that caused suffocation or aspiration in people aged 65 and higher within the jurisdiction of Tokyo Fire Department (FY2016)

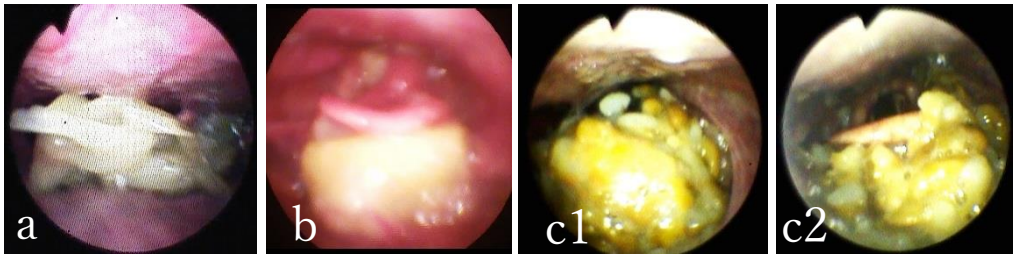


Fig. 2

a: A large amount of food is remaining that may prevent respiration after swallowing. The patient is not aware of the remaining food.

b: Bolus before swallowing. Rice cracker is sent to the pharynx without any crushing.

c1 (before swallowing), c2 (after swallowing): A large amount of bolus with insufficient crushing is raked in before swallowing, and a considerable part still remains after swallowing. The patient does not know how to remove the remaining food.

CQ1-2 What types of simple masticatory function evaluation methods are available?

CQ1-2	What types of simple masticatory function evaluation methods are available?
Recommendation	A simple method for evaluating the masticatory functions is to use endoscopic examination of swallowing (Videoendoscopy: VE) or Saku Saku Test (SST).
Explanation	[Background] While it is said that there is no single method to comprehensively evaluate the masticatory ability, the methods to test the masticatory ability can be classified into direct testing methods to directly determine the ability by using mastication samples and indirect testing methods to determine the ability based on other factors related to mastication[1]. Direct testing methods include the conventional sieve method using crushable mastication samples such as peanuts[2] (method to determine by the distribution of crushed particles of the mastication sample), color-changeable chewing gum[3] (method to determine based on the mixing conditions of the food), and gummy jelly which was recently introduced as a health insurance treatment[4] (method to determine based on the amount of the content flowing out of the mastication sample). There is also a method to have the patient bite a polyethylene film (method to determine based on the perforation state of the mastication sample). However, these methods cannot be applied to patients who have difficulty in spitting out the sample they have put into the mouth and masticated. There are also various questionnaire surveys (method to determine based on masticatory function judgment table), but these are difficult to use when the patient has cognitive problems, as these depend on the subjective senses of the patient and their family. [Explanation] While the direct testing methods described above mainly involve spitting out the bolus, it is difficult to ask the

patient to spit out the masticated matters if the patient has difficulty in following orders due to dementia and so forth. Some tests are also too complex to implement in the field under visiting care. On the other hand, VE offers the advantages that it can be used to evaluate the eating and swallowing functions from mastication to swallowing in the natural flow, and that it does not require the patient to follow complex instructions, even though the equipment must be prepared. In evaluation of masticatory functions using VE, the degree of bolus grinding immediately before swallowing (indicator for whether the food is crushed into small pieces), the degree of aggregation (indicator for the dispersion of bolus), and the degree of mixing (indicator for how well the bolus is mixed) are used[5,6] (Table 1).

In addition, indirect testing methods determine the masticatory functions based on indirect factors related to mastication, such as muscle activities, occlusal contact, and occlusal force, and one such method is SST[7]. This is a method for evaluating the movement of the lower jaw while facing the patient after giving the patient half a piece of Happy Turn® (Kameda Seika Co., Ltd.). It is evaluated as good if the lower jaw movement is teardrop-shaped or nearly oval, and not good if the lower jaw movement is almost vertical (Fig. 1). It can be assumed that both the degree of grinding and the degree of aggregation during mastication are good if the result of SST is good, and that the degree of grinding is bad if the result of SST is bad.

For details, see the guidelines on masticatory disorder evaluation methods published by Japan Prosthodontic Society[1].

References

1) http://www.hotetsu.com/s/doc/Guidelines.pdf

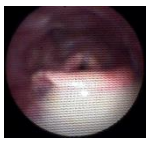
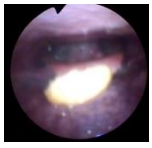
2) Manly RS, Braley LC. Masticatory performance and efficiency. Journal of dental research. 1950;29(4):448-462.

3) Hama Y, Kanazawa M, Minakuchi S, Uchida T, Sasaki Y.Properties of a color-changeable chewing gum used to evaluate masticatory performance. Journal of prosthodontic

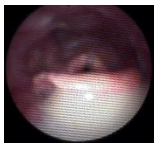
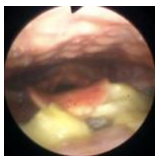
research. 2014;58(2):102-106.
4) Tanaka A. et al. Quantitative Evaluation of Mandibular Movements and Masticatory Muscular Activities by Analyzing the Amount of Glucose Discharge during Gumi-jelly Chewing. J JPn Prosthodont Soc,38:1281-1294,1994.
5) Sasao Y, Nohara K, Kotani Y, Sakai T. Videoendoscopic Evaluation of the Bolus Preparation Function for Dentulous Healthy Subject. Japanese Journal of Gerodontology. 2008;23 (1):42-49.
6) Fukatsu H, Nohara K ,Kotani Y, Tanaka N, Matsuno K, Sakai T. Endoscopic evaluation of food bolus formation and its relationship with the number of chewing cycles. Journal of oral rehabilitation. 2015;42(8):580-587.
7) Tagashira I, Tohara H, Wakasugi Y, Hara K, Nakane A, Yamazaki Y, Matsubara M, Minakuchi S. A new evaluation of masticatory ability in patients with dysphagia: The Saku-Saku Test. Arch Gerontol Geriatr. 2018;74:106-111.

Strength of evidence	B (intermediate): There is intermediate certainty for the estimated value of the effect.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

Table 1 Evaluation criteria for bolus formation function[5,6]

	Degree of grinding	
2 points	Thoroughly ground	
1 point	Mostly ground, but some have not been ground	
0 points	Mostly unground	

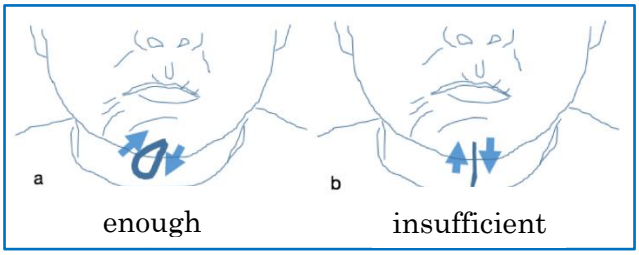
Degree of aggregation

2 points	Aggregated in one bolus	
1 point	Separated into multiple bulks	
0 points	No aggregation	

Degree of mixing

2 points	Mixed well
1 point	Mostly mixed, but some remain unmixed
0 points	Mostly unmixed

Fig. 1: SST evaluation method[7]



CQ1-3 Can we assume the swallowing function to be good if the mastication function is good?

CQ1-3	Can we assume the swallowing function to be good if the masticatory function is good?
Recommendation	While the swallowing functions are good if the masticatory functions are good in many cases, it is better to evaluate these two separately.
Explanation	

[Background]

Masticatory functions and swallowing functions are closely related, and the problems in oral cavity such as insufficient crushing or formation of bolus can often cause aspiration or suffocation in elderly people (see CQ1-1). For example, the symptoms vary depending on the affected part in cerebrovascular diseases, thus good mastication may not always mean good swallowing functions.

[Explanation]

There is a report that claimed no correlation between the specific lower jaw rotation movement and pharynx functions when the previously described SST was used, even though the specificity for detection of aspiration was high[1]. While good masticatory functions come with good swallowing functions in many cases, it is necessary to evaluate the pharynx functions separately instead of only focusing on the masticatory functions. As equipment is limited in visiting care, it is recommended that one should be ready to conduct at least a screening test on masticatory functions and swallowing functions. As there are cases that require careful examination with VE and so forth regarding the swallowing functions, it would be better to ensure that you have someone to give referral to if it is impossible to conduct a careful examination by yourself. See CQ1-5 for the screening test on swallowing functions.

References	1) Takahashi N. et al. Evaluation of tongue motor function using videoendoscopic evaluation system for patients with mastication disorders with motor dysfunction. Jpn J Gerodontol. 2009;24(1):20-27.
Strength of evidence	D (very weak): The certainty for the estimated value of the effect is very low.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ1-4 Can the masticatory function be recovered by preparing dentures for a patient without occlusal support?

CQ1-4	Can the masticatory function be recovered by preparing dentures for a patient without occlusal support?
Recommendation	Individual examination is necessary.
Explanation	[Background] During mastication, teeth, tongue and the surrounding muscles go through complex motions in coordination. Deterioration in masticatory functions can occur due to various causes, including organic problems such as loss of tooth, deterioration or disuse of motor ability in muscles surrounding the oral cavity, and cerebrovascular diseases[1)]. [Explanation] It is possible that the masticatory functions will not be restored by only preparing artificial denture unless the above oral function problems are improved. Since it is more likely that patients who stay at home have reduction in oral functions as well as ADL compared to outpatients, assessment will be necessary. Therefore, sufficient explanation should be provided that it takes time until the patient can get used to the denture, and that the form of diet may not be improved in some cases even if denture is prepared, before preparing artificial denture for patients whose oral functions have deteriorated. In addition, the functions may be improved through mastication training even if they cannot be improved immediately after preparing artificial denture. Furthermore, some patients who show primitive reflexes such as sucking due to frontal lobe symptoms, and those whose masticatory patterns are lost due to pontine lesions may only be capable of movements that will not result in mastication even if artificial denture is prepared and occlusion is addressed, since they may not be able to achieve

	the masticatory patterns in the first place. In other cases, mastication may become difficult if the amount of saliva is small. Causes of such cases include disorders such as Sjogren's syndrome, effects of aging or drugs, subsequent complications of radiation therapy and insufficient fluid intake.
References	1) Kikutani T, Tamura F, Nishiwaki K, Kodama M, Suda M, Fukui T, Takahashi N, Yoshida M, Akagawa Y, Kimura M. Oral motor function and masticatory performance in the community-dwellingelderly. Odontology. 2009;97(1):38-42.
Strength of evidence	No evidence.
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ1-5 Is the screening test enough to evaluate swallowing?

CQ1-5	Is the screening test enough to evaluate swallowing?
Recommendation	VE should be conducted if there is a problem in screening test on swallowing, if there is medical history to be noted such as aspiration pneumonia, or if measures cannot be come up with for symptoms that lead to suspicions of dysphagia even if no problem is found in the screening test. If VE is not possible, measures should be determined while closely observing the symptoms that lead to suspicion of aspiration such as fever, increased phlegm, and hoarse voice as well as low-nutrition states such as losing weight, dry skin and dry mouth, and reduced skin elasticity.
Explanation	[Background] Screening tests vary in sensitivity and specificity. [Explanation] Since equipment has limitations in the field of visiting care, it is of course important to utilize screening tests. However, it is desired that they are conducted with sufficient understanding of the characteristics of each test as the information that can be grasped in screening tests is only partial. Table 1 shows the sensitivities and specificities of the screening tests that are frequently used in clinical field (Modified Water Swallowing Test (MWST), Food Test (FT)[1], repetitive saliva swallowing test (RSST)[2] for aspiration, and cough test for silent aspiration[3]). As to how to use the table, for example the people with problematic results in RSST would include many healthy individuals as it has low specificity, even though it has high sensitivity and is capable of finding patients with problems. Although tests with high sensitivity and specificity would be good, they are basically in a trade-off relationship. RSST tends to screen dementia patients who have difficulty in following orders even if there is no aspiration. It is recommended that tests are conducted by wiping inside the oral cavity to moisturize, since there are points to be noted in conducting tests, including difficulty to

induce swallowing due to dry mouth. Furthermore, it is better to employ creative measures such as using rice porridge and food that requires mastication to increase a load, when food test is cleared, since it is easy for the patient to eat without remaining food when pudding and so forth is given to swallow in one bulk. In addition, screening tests do not have to be conducted unless it is necessary, since they are conducted for the purpose of screening.

VE should be conducted if the patient is positive in a screening test or has clear clinical symptoms that lead to suspicion of dysphagia even if testing is not conducted, and if measures cannot be determined without close examination. However, it must be noted that there are patients who actually present aspiration even without a clear primary disease or clinical symptoms. It is also recommended that VE is conducted if there is situation where the results of image diagnosis are considered necessary for the purpose of getting consensus among interprofessional collaboration members and family.

References

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2) Oguchi K. et al. The Repetitive Saliva Swallowing Test (RSST) as a Screening Test of Functional Dysphagia (1) Normal Values of RSST. The Japanese Journal of Rehabilitation Medicine 2000;37(6):375-382.
3) Wakasugi Y, Tohara H, Hattori F, Motohashi Y, Nakane A, Goto S, Ouchi Y, Mikushi S, Takeuchi S, Uematsu H. Screening test for silent aspiration at the bedside. Dysphagia. 2008;23(4):364-370.

Strength of evidence

A (strong): There is strong certainty for the estimated value of the effect.

Reliability based on literature

Reliability based on literature

A: There are multiple supporting reports and they mostly coincide. There are highly reliable reports.

Table 1: Sensitivities and specificities of screening tests

	Sensitivity (%)	Specificity (%)
Modified Water Swallowing Test	70	88
Repetitive saliva swallowing test	98	66
Food Test	72	62
Cough test	87	89

CQ1-6 In what flow is endoscopic examination of swallowing done?

CQ1-6	In what flow is endoscopic examination of swallowing done?
Recommendation	It should be done in a flow from inquiry, information collection, adjustment of posture and head position, depot removal and cleaning, to insertion of endoscope, instead of conducting VE immediately.
Explanation	

[Background]

While endoscopic examination of swallowing has become popular in recent years, we also see many cases in which they regard conducting only the swallowing function test as equivalent to conducting a series of eating and swallowing function evaluations. This section shows the rough flow for endoscopic examination of swallowing as a test on eating and swallowing functions. Please refer to CQ1-7 for the purpose.

[Explanation]

The following outlines the flow:

1) Inquiry and information collection

Since characteristic dysphagia may appear depending on the disorder, the medical history as well as the history of present illness should be interviewed. If necessary, the physician in charge should be asked to provide diagnosis and treatment information. If the patient has a certification of care need, notifying the care manager facilitates cooperation thereafter. Symptoms that lead to suspicion of aspiration such as fever and presence of phlegm should also be checked. Furthermore, for patients with oral intake of nutrients, information should be collected on how the patient usually takes meals and eats, time of intake, environment, internal medicines (drugs that can cause drug-induced dysphagia such as antipsychotic agents, effects of on-off of Parkinson's disease, period and time of drug administration, and compliance), weight increase/decrease (weight increase/decrease of -5%Kg/month

is an indicator for high risk of undernutrition), presence of help, difficulty in providing help and so forth. If blood data is available, nutritional conditions should be checked with albumin value and prealbumin value, inflammatory reaction with CRP value, dehydration with BUN value or CRE value, anemia with Hb value and so forth. Although albumin value is not suited to short-term evaluation of nutritional conditions as it is a long-term indicator with the half-life of approximately 20 days, it can be used for reference in chronic patients with somewhat stable conditions. For CRP, comprehensive judgment will be necessary by including leukocyte count, differential white blood count, vital, and rapid changes in ADL, since it is not a marker specific to infectious diseases. If it is impossible to measure the body weight, it is acceptable to conduct the finger-ring test[1] or measure the lower thigh circumference to evaluate the body. Stability for trunk retention and so forth is also necessary information for safe oral intake. Other inquiry that is often helpful includes asking the kinds of food the patient likes and dislikes. As oral information, remaining teeth, oral hygiene conditions, occlusal state, and crude movements of the muscles surrounding the oral cavity should be examined. It is also recommended to ask about the patient's wish such as wanting to eat with the family or eat out, in addition to the chief complaint such as choking and difficulty in eating.
Sufficient explanation should be provided on the examination and written consent obtained before conducting VE examination.

2) Adjustment of posture and head position
While checking the usual environment and posture for meal intake, the patient should be adjusted to an appropriate posture using the bed, chair, pillows, wheelchair and so forth. E.g.) Helping to adjust so that the head is stable using pillows or towels, support the hip and sides with

cushions and adjusting the armrest height if trunk retention is difficult, and adjust the heights of the bed, chair and table.

3) Depot removal and cleaning
If oral hygiene is poor, cleaning should be conducted. If a large amount of phlegm has accumulated at the pharynx, ask the patient to expel. If it is difficult for the patient to expel by oneself, suction should be conducted. It is also recommended to conduct VE first and execute suction if secretions have accumulated at the pharynx in a large amount.

4) Insertion of endoscope
After inserting the endoscope from nasal cavity, nasopharynx, pharynx, base of the tongue, and larynx should be observed to evaluate the organic dysfunctions and functional disorders. For details, please refer to Procedures for endoscopic examination of swallowing[2)], which is published by the Japanese Society of Dysphagia Rehabilitation.

References

1) Oguchi K, Saitoh E, Mlzuno M, Baba M, Okui M, Suzuki M. The Repetitive Saliva Swallowing Test（RSST）as a Screening Test of Functional Dysphagia(1) Normal Values of RSST. Jpn J Rehabil Med. 2000;37(6):375-382.
2)https://www.jsdr.or.jp/wp-content/uploads/file/doc/endoscope-revision2012.pdf

Strength of evidence

B (intermediate): There is intermediate certainty for the estimated value of the effect.

Reliability based on literature

Reliability based on literature
B: There are one or more supporting reports.

CQ1-7 For what purpose is endoscopic examination of swallowing conducted?

CQ1-7	For what purpose is endoscopic examination of swallowing conducted?
Recommendation	It is conducted for the purpose of (1) Finding functional disorders during the pharyngeal stage, (2) Finding organic dysfunctions, (3) Confirming the compensation method or rehabilitation technique, and (4) Providing information to or gaining consensus of the patient, family and staffs.
Explanation	[Background] VE is not an examination which is used to only confirm the presence of aspiration, food remaining at the pharynx, and the pharyngeal functions. It is an examination that is conducted while considering the appropriate style of diet, necessary training methods and even what direction the treatment should aim for in the future. [Explanation] It is conducted for the following 1) to 4) as the purpose. Instead of conducting the examination aimlessly, it should be done while clearly specifying the purpose of examination beforehand. 1) Finding functional disorders during the pharyngeal stage It can be used to evaluate the hygiene conditions and so forth, including nasopharyngeal atresia, glottal closure, quality of pharyngeal contraction and presence of laterality, presence of saliva accumulation, presence of food and saliva aspiration, and accumulation of secretion at pharynx. Caution is necessary on entry from the interarytenoid notch into the trachea, as endoscopic examination of swallowing cannot be used to directly confirm aspiration into the posterior wall of the trachea. If entry into the trachea is suspected, the patient should be made to utter voice or clear the throat to check the expectorated matters. 2) Finding organic dysfunctions

If an organic dysfunction such as a tumor is suspected, the patient shall be referred to an otorhinolaryngologist.

3) Confirming the compensation method or rehabilitation technique

The problems of the patient should be extracted by combining the VE results and other information to set up the potential for oral intake, the concentration of thickening in moisture that can be taken, the forms of food, the method of intake and posture. If safe oral intake cannot be ensured only by adjusting the method of eating and if the patient is somewhat capable of following instructions, necessary compensation methods should be examined including clearing the throat, additional swallowing and alternate swallowing. Furthermore, if there is applicable indirect training necessary for maintaining and improving the eating and swallowing functions, the method should be examined. The policy for treatment should always be determined upon confirming whether the patient is doing better or worse than usual, even if examination results on the presence of aspiration and so forth are available.

4) Providing information to or gaining consensus of the patient, family and staffs

Since VE can be used to examine while using the food materials that are usually eaten, actually use food materials that can be easily obtained by the patient, and examine with the usual posture for meals, it is easy to interpret the results of swallowing function examination and utilize the obtained information in daily meals and so forth. Referring to the VE images, explanation should be given to the patient and family, and information should be shared among the interprofessional collaboration members including the physician in charge, nurses, care manager, and nursing care staffs. If this examination is done after re-examination and later, diagnosis for being better or worse should always be considered in comparison with prior results. For details,

	please refer to Procedures for endoscopic examination of swallowing[1)], which is published by the Japanese Society of Dysphagia Rehabilitation.
References	1) https://www.jsdr.or.jp/wp-content/uploads/file/doc/endoscope-revision2012.pdf
Strength of evidence	A (strong): There is strong certainty for the estimated value of the effect.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ1-8 Should eating be forbidden if it is impossible to prevent accidental swallowing or entry at larynx?

CQ1-8	Should eating be forbidden if it is impossible to prevent accidental swallowing or entry at larynx?
Recommendation	Individual examination is necessary.
Explanation	[Background] While aspiration pneumonia is a risk that occurs in concurrence with swallowing functions, there is also a report that indicate saliva aspiration even in approximately half of young, healthy men during sleep[1)], meaning that pneumonia does not always occur just because there is aspiration. [Explanation] Since the onset of aspiration pneumonia occurs when the invasion of aspiration and so forth is stronger than resistance, it is better to examine the methods to prevent aspiration considering the type of diet, posture, compensation methods, and methods to expectorate, and improve the nutritional conditions and oral environment instead of prohibiting eating immediately in cases in which the patients have continued oral intake without problem for many years even when aspiration is observed in examination. Since the influence of environmental factors such as the nursing abilities of the family is considerable in visiting care, comprehensive judgment should be made while including such environmental factors. Furthermore, it is possible that the cause of aspiration pneumonia is not the aspiration of food but saliva aspiration at night or aspiration of gastroesophageal reflux. It is therefore important not to fuss over only the aspiration of food. There is also a report that said approximately 60% of the patients in their 80s for whom an order of eating and swallowing rehabilitation was issued after being admitted into a hospital presented esophageal stagnation or reflux.

	If the examination clearly indicates aspiration and if the systemic conditions are not favorable, it should be reported to the patient, family and the physician in charge in principle to examine the safe methods of nutrition intake, including tube feeding. However, this does not always apply to terminal phases, and QOL may need to be prioritized in some cases. It is important to communicate well with the related interprofessional collaboration members and the family.
References	1)Gleeson K, Eggli DF, Maxwell SL. Quantitative aspiration during sleep in normal subjects. Chest. 1997;111(5):1266-1272.
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ1-9 Is it enough to just increase the training frequency if indirect training is not showing any effects?

CQ1-9	Is it enough to just increase the training frequency if indirect training is not showing any effects?
Recommendation	Individual examination is necessary.
Explanation	[Background] To enhance the training effects, it should be ensured that the nutritional conditions and the motivation are maintained while taking into consideration the strength and frequency. [Explanation] First, the term of rehabilitation does not mean training. It must be ensured that indirect training will not be applied to all patients with poor swallowing functions. What part needs to be adjusted should be considered comprehensively upon taking into account what part of the mental and physical functions, activities and social participation of the patient should be improved with awareness for the concept of ICF and including the health conditions, environmental factors and individual factors. Training should be implemented if it is considered necessary as a result. If training is implemented while the patient suffers undernutrition, it may exhaust the body and lead to an opposite result. In principle, it is best to start training after ensuring safely sufficient nutrition. If only the minimum amount of nutrition for maintaining life is being supplied from tube feeding, they probably do not anticipate doing muscular strength training. In such cases, consideration should start on advisability of muscular strength training in the first place upon coordinating with the physician in charge, and then proceed to review of the amount of nutrition if necessary. Muscular activity of 20% to 30% of the maximum muscular strength needs to be executed in order to maintain the

muscular strength[1], and loading of 70% to 80% of the maximum muscular strength is required in training when growth of the muscle fiber is expected. It must be thus noted that simply moving the tongue or doing dysarthria training aimlessly will not function as muscular strength training, even if it may function as warm-up. Furthermore, it is necessary to apply the required load while improving the nutritional conditions, as increase in muscular strength by resistive exercise is improved by protein intake[2].

Since it has been pointed that disuse will progress as the period of bedrest is longer, that the sitting ability is related to the swallowing functions[3], and that there is correlation between the muscular strength related to eating and swallowing and the muscle mass in the trunk[4], it is effective to first extend the period for sitting for patients who almost never leave the bed.

The frequency of training should not be uniform, and the training menu and frequency should be reconsidered for each patient while observing progress, since the effects of training at home is affected by the conditions of the patient, nursing abilities, environment and so forth. If expected effects are not observed, it is possible that the training menu itself is not suited or that the patient is unable to do the training. It is then necessary to reconsider the menu or confirm the appropriate method and purpose. In addition, it is difficult to expect improvement in ADL including swallowing if the patient does the training during the training time but spends the rest of the day lying down. “How to spend time” without losing physical strength and muscular strength should always be considered. At any rate, we should try to communicate with the patient so that their motivation can be maintained, if the patient truly requires training. Muscular strength training that would result in excessive load should not be given to patients with disorders that involve overuse syndrome, in which muscular strength training may conversely cause deterioration in muscular strength.

References	1) Hettinger T, Muller EA. [Muscle capacity and muscle training]. Arbeitsphysiologie. 1953;15(2):111-126. 2) Moore DR, Robinson MJ, Fry JL. et al. Ingested protein dose response of muscle and albumin protein synthesis after resistance exercise in young men. Am J Clin Nutr. 2009;89(1):161-168. 3) Wakao M, Fukumitsu H, Tanaka Y, Tokumura H, Hoshi T. Examination of Relationships between Sitting Ability,Eating and Swallowing Function,and Urinary Incontinence. Rigakuryoho Kagaku 2014;29(3):377–381. 4) Yoshimi K. et al. Relationship between swallowing muscles and trunk muscle mass in healthy elderly individuals: A cross-sectional study. Arch Gerontol Geriatr. 2018;79:21-26.
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ1-10 To what patients is palatal augmentation prosthesis applicable?

CQ1-10	To what patients is palatal augmentation prosthesis applicable?
Recommendation	It is mainly applicable to patients of eating disorder/dysphagia caused by cerebral apoplexy, neuromuscular diseases, and surgery on cancer in the head and neck region.
Explanation	[Background] Palatal Augmentation Prosthesis (herein after referred to as PAP) is a prosthetic device which is prepared for the purpose of improving articulation or eating disorder/dysphagia (especially in the oral stage). It is one of the important measures against oral stage disorders. [Explanation] It is a device which is used for patients who cannot address contact between tongue and palate due to a small volume of tongue, low position of tongue, poor tongue movements and so forth. It is formed between tongue and palatal part so that the palatal part is thickened to suit the functions of the patient. Either the palatal part of denture for upper jaw is thickened (**Fig. 1**), or palatal s is prepared if there is no loss of upper jaw teeth (**Fig. 2**). For details, please refer to the clinical practice guidelines on Palatal Augmentation Prosthesis (PAP) for eating disorder/dysphagia and articulation disorder, edited by the Japanese Society of Gerodontology and Japan Prosthodontic Society[1)].
References	1) http://minds4.jcqhc.or.jp/minds/pap/pap.pdf
Strength of evidence	B (intermediate): There is intermediate certainty for the estimated value of the effect.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

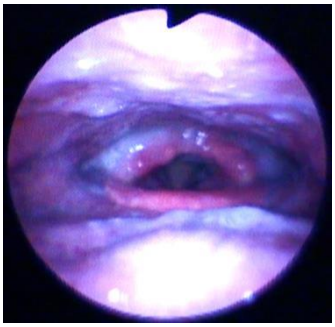
Fig. 1: PAP to thicken the palatal part of denture for the upper jaw

Fig. 2: PAPA for palatal plate

[Case]

A case that was handled in home visits starting from indirect training until they began direct training is introduced here.
Patient: 60-year-old male
Name of disease: Cerebellar hemorrhage
The patient was transferred to an acute care hospital due to cerebellar hemorrhage, had an onset of dysphagia, and was forbidden to eat or drink with gastric fistula established. Since there was a request for eating and swallowing rehabilitation to the university hospital dentistry department through the MSW from the physician in charge at the hospital before being discharged from the convalescence care hospital he had been transferred to, home visits were made.
Chief complaint: The patient strongly wished for oral intake.
Problem: Disuse and poor medical support for cerebellar symptoms had increased the difficulty for oral intake support.
Support: Gradual improvement of the problem was observed, and direct training became possible by establishing cooperation between the physician in charge and other people in medical profession (Table 1).

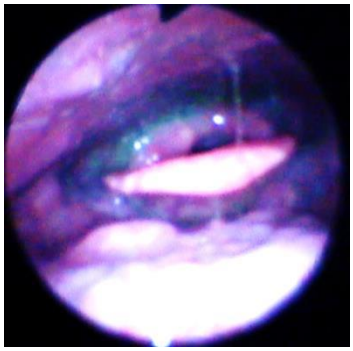
Table 1:

Date	Progress	Measure and policy	Applicable CQ
At initial diagnosis BMI: 16.5 (undernutrition) Amount of nutrition: 1,000kcal/day Oral intake level: Indirect training only	[Problem] (1) Phlegm accumulation  at pharynx (2) Poor sending function by tongue	(1) Explanation of VE examination results. Consultation on the future policy. Phlegm expulsion training instruction.	(1) Flow of VE examination → See CQ1-6. Information sharing with VE examination images → See CQ1-7.

	(3) Disuse and difficulty in trunk retention (4) Poor medical resources	(2) Instruction on tongue resistance training, dysarthria training (3) Targeting the extension of end seating period (10 minutes) (4) Request for intervention by someone in rehabilitation service in coordination between the physician in charge at hospital and the physician in charge for home care	Training in (1), (2) and (3)→ See CQ1-9. (4) Coordination with the physician in charge → See CQ1-6.
152 days later BMI: 16.5 (no change) Amount of nutrition: 1,000kcal/day Oral intake level: Indirect training only	(1) Examination of intervention by interprofessional collaboration (ST, PT, home nursing). The patient felt dizzy when sitting up, and training could not be implemented. (2) Aspiration of a small amount occurred even though thickened water	(1) Request for ST and breathing training, PT and training to strengthen trunk, and instruction on leaving the bed. (2) Preparation of palatal augmentation	(1) Relationship between sitting ability or trunk muscle mass and swallowing functions → See CQ1-9. (2) PAP

	flowed into the pharynx at 45 degrees of reclining, and the patient had difficulty in expectorating. At the sitting position, jelly was pushed back by the tongue (photograph).  (3) Poor oral hygiene conditions were observed. (4) Nutritional conditions were not seen to improve.	prosthesis (PAP) was started. Instruction on coughing training for expectoration of aspirated matters. (3) Recommendation of visiting intervention by dental hygienists to improve the oral hygiene (4) Increase in amount of tube nutrition was consulted with the physician in charge.	→ See CQ1-10. Aspiration → See CQ1-8. (3) Oral hygiene → See CQ1-8. (4) Nutrition → See CQ1-9.
241 days later BMI: 19 (improved) Amount of nutrition: 1800kcal/day Oral intake level:	(1) Amount of nutrition supplied by tube increased, with tendency for BMI to improve. (2) Vitality improved, and progress was smooth with rehabilitation.	(1) (2) To increase the load of training, implementation of voluntary indirect training was instructed.	(1), (2) Training and nutrition → See CQ1-9.

Indirect training only	Dizziness was improved, and sitting period extended to 30 minutes. Moving to the bathroom became smoother. (3) PAP setting  (photograph)	(3) The patient became used to wearing PAP.	
301 days later BMI: 20.3 (improved) Amount of nutrition: 1800kcal/day Oral intake level: Direct training Indirect training	(1) Improved vitality and increased volume of voice (2) No discomfort in wearing PAP, and capable of speaking while wearing it. Articulation improved from 4→2. 4: Speech is sometimes comprehensible. 2: Speech is sometimes incomprehensible. (3) Oral hygiene condition improved.	(1) Continuation of indirect training (2) Dysarthria training by using RAP (3) Instruction on how to give oral care to the family (4) Starting of direct training with ST Environmental setting for training was provided to give instruction on	

	(4) Moisture with 1% thickening was sent to the pharynx and intake occurred without aspiration at 45 degrees of reclining. (photograph) 	direct training with the family. Increased the training frequency.	

●Chapter 2: Conservation therapy

[Chapter 2: Significance of conservation therapy, Table of contents]

In the actual field of visiting dental care, conservation therapy of teeth also includes prevention of adverse effects on the systemic conditions as a source of infection, in addition to the simple restoration of masticatory function and pain removal, since the patients are basically the sick, the elderly or the disabled.

In visiting dental care, it is difficult to implement the treatment at the same level as the conservation therapy at a dental clinic, due to the lack of equipment and the aspects of risk management. It is necessary to determine the treatment policy that seems the best feasible one comprehensively judging the degree of the disability and systemic conditions of the patient while placing importance on the maintenance and improvement of Quality of Life (QOL) rather than the treatment that is considered best in dentistry. Simply put, it means case by case. However, this is a type of treatment in which the total ability of the dentist as a medical care provider will be tested, and both knowledge and experience will be necessary in making the decision. It would be our joy if this CQ can be of any help in doing so.

CQ2-1: What types of conservation therapy is necessary in visiting dental care?
CQ2-2: What treatment policy should be adopted when dental caries is observed in a patient of visiting dental care?
CQ2-3: Should asymptomatic teeth with residual roots preserved in visiting dental care?
CQ2-4: What measures should be taken if the patient has dental caries but cannot follow the direction to open the mouth due to dementia or disability?
CQ2-5: Should root canal therapy be implemented in visiting dental care?
CQ2-6: Should periodontal treatment be implemented at home?
CQ2-7: What measures should be taken if there is a considerably mobile tooth?
CQ2-8: Can it be considered that the systemic conditions will improve with periodontal treatment at home?

CQ2-1 What types of conservation therapy is necessary in visiting dental care?

CQ2-1	What types of conservation therapy is necessary in visiting dental care?
Recommendation	While all types of conservation therapy are necessary, they shall be implemented within the possible range to suit the situation.
Explanation	[Background]

Fig. 1 shows the results of a survey on the treatment during visiting dental care from randomly selected dental clinics providing home care in Japan. While treatments related to denture, periodontal treatments and oral hygiene instructions occupy a large percentage, dental crown repair (filling), caries treatment, pulp extirpation, infected root canal treatment and so forth are also implemented although not too frequent[1].

[Explanation]

Since patients who receive visiting dental care cannot come to dental clinics due to some disorder, they often have trouble cleaning the oral cavity by themselves because of the same disorder. As a consequence, advanced caries and periodontal diseases are often observed. In visiting dental care, all types of conservation therapy in dentistry such as caries treatment, periodontal treatment and root canal treatment become necessary when problems in the oral cavity occur. There are many commercial portable units for visiting dental care available, and it is possible to implement conservation treatments. However, the treatment may become limited depending on the disorder in the medical field with which the patient is affected, the degree of disorder, ability to communicate and so forth. Therefore a comprehensive decision must be made on whether to implement each conservation treatment in dentistry upon grasping various elements that surround the patient. Since how to handle each case is not fixed but is left to the decision of each dentist, it is necessary to make a comprehensive decision by acquiring the

knowledge for management of the entire body and analytical ability in addition to the knowledge on dental disorders.

In conservation therapy during visiting dental care, it is necessary to make a comprehensive decision from the viewpoint of removing pain and improving the Quality of Life (QOL), instead of only taking measures that are considered correct in the field of dentistry to treat and improve all problems in the oral cavity.

References	1) https://www.mhlw.go.jp/file/06-Seisakujouhou-10800000-Iseikyoku/0000107074.pdf
Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

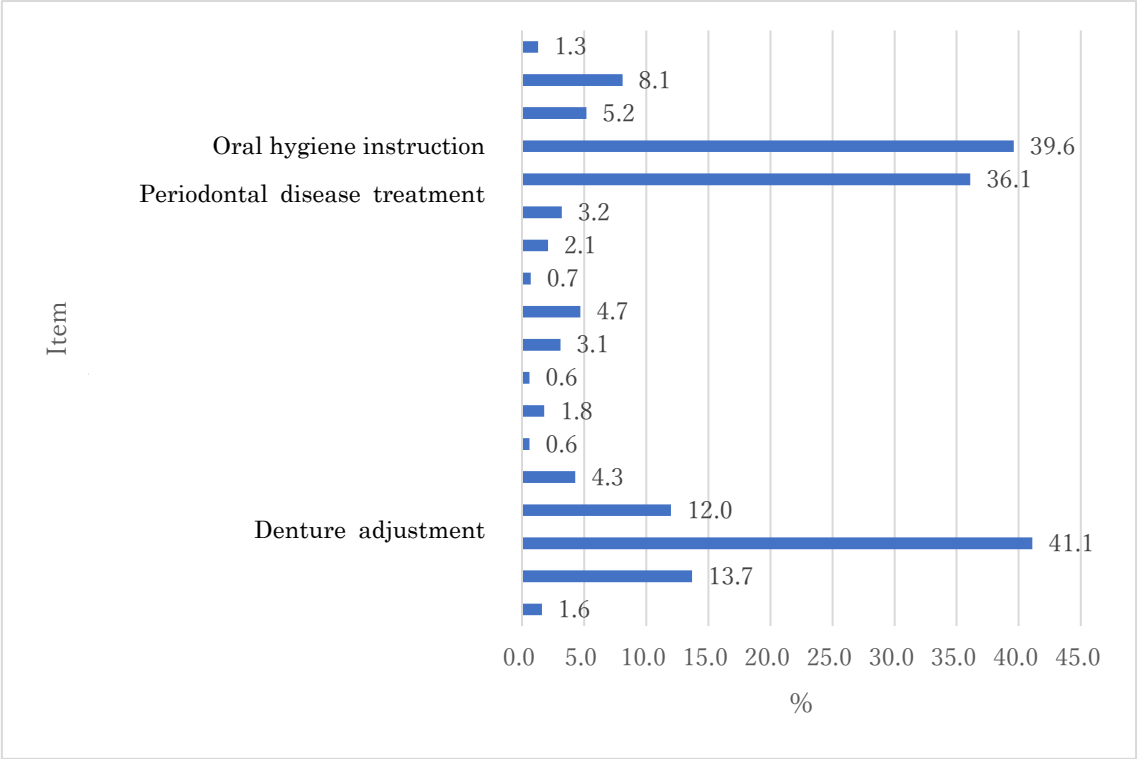


Fig. 1: Description of diagnosis and treatment on the day of survey (multiple responses, n = 1,247)

CQ2-2 What treatment policy should be adopted when dental caries is observed in a patient of visiting dental care?

CQ2-2	What treatment policy should be adopted when dental caries is observed in a patient of visiting dental care?
Recommendation	While carious tooth should be treated if any, complex treatments are difficult to implement in the scenes of visiting dental care, and treatments must be given within the possible range that suits the systemic conditions and situation of the patient.
Explanation	[Background] The patients of visiting dental care have difficulty in visiting dental clinics because of various disorders. The primary disease that became the cause of requiring nursing care is found to be dementia in 18.7%, cerebrovascular disorders in 15.1%, debilitation by aging in 13.8%, broken bones or falling in 12.5%, and joint diseases in 10.2%[1)]. Since the situation varies by the disorder, the possible range of dental treatment implementation also varies. [Explanation] The primary disease that resulted in requirement of visiting dental care varies widely by the patient. Depending on the disease, elements that affect the dental treatment also vary, including how much cooperation the patient is capable of giving during treatment, whether the patient can maintain a posture, and deterioration in oral cavity and swallowing functions. Because of this, there are no specific treatment methods to be adopted in visiting dental care, but the dentist must consider the treatment case by case. In doing so, it is necessary that the dentist should understand the systemic conditions, eating and swallowing functions and so forth as prerequisite conditions. Treatments to cut and fill the tooth may be selected if there are symptoms including pain. Aspiration of the water injection for cutting may occur depending on the patient's consciousness

	level, swallowing functions, and ability to retain the oral cavity position. It would be better to collect information on the usual eating conditions in advance and evaluate the swallowing functions if necessary. The softened dentine should be removed by cutting, the pulp capped if necessary and filling treatment implemented over it. While it is easier to use light-cured composite resin in filling treatment, it may be better to use glass ionomer cement in filling in some cases, since the composite resin requires further cutting for recontouring. If the patient is incapable of cooperating in treatment even though there is carious tooth, tooth extraction, which is a relatively simpler work than filling treatment, may have to be selected. However, again, whether to implement this needs to be determined based on the systemic conditions. It is therefore necessary to grasp the eating and swallowing functions as well as the systemic conditions even for a treatment of carious tooth.
References	1) https://www8.cao.go.jp/kourei/whitepaper/w-2018/zenbun/pdf/1s2s_02_01.pdf https://www8.cao.go.jp/kourei/whitepaper/w-2018/zenbun/pdf/1s2s_02_02.pdf
Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ2-3 Should asymptomatic teeth with residual roots preserved in visiting dental care?

CQ2-3 Should asymptomatic teeth with residual roots preserved in visiting dental care?

Recommendation While they should be extracted in principle as they can be sources of infection, ability to communicate and the systemic conditions should also be taken into consideration.

Explanation

[Background]

While it is the same as the [Background] for CQ2-2, the primary disease of those who require nursing care and receive visiting dental care is found to be dementia in 18.7%, cerebrovascular disorders in 15.1%, debilitation by aging in 13.8%, broken bones or falling in 12.5%, and joint diseases in 10.2%[1]. Kikutani, et al. reported that 19.1% of elderly people capable of visiting outpatient care had teeth with residual roots[2]. Even though there is no data for people who receive visiting dental care, the rate is expected to be larger.

[Explanation]

The advantages of preserving the teeth with residual roots include preventive effects on alveolar ridge resorption, which contributes to the stability of denture[3]. However, teeth with residual roots can act as sources of infection, and extraction is desired in principle. In particular, elderly patients who require nursing care and receive visiting dental care have a high risk of such teeth becoming sources of not only the infection inside the oral cavity such as the periodontal tissue but also aspiration pneumonia and so forth.

It is therefore best to consider teeth extraction upon taking into consideration the systemic conditions, whether the patient is capable of cooperating in treatment, the status of drug administration, opinion of the physician in charge and so forth. However, tooth extraction is of course an invasive treatment which comes with risks, and it is difficult to implement in practice in many cases of visiting dental care. For example, tooth extraction tends to be difficult in patients with dementia in the middle to terminal phase as they are

not capable of cooperation. We often feel hesitant to implement tooth extraction in patients of cerebrovascular disorders because there is hemorrhagic diathesis caused by drugs (although tooth extraction is possible with only local hemostasis in practice). There are many clinical cases in which the teeth with residual roots are preserved based on such reasons. When they are preserved, it is desired that measures such as root canal treatment and filling the surface of the teeth with residual roots, and instructions on oral hygiene should be implemented, although this also depends on the systemic conditions and whether the patient is capable of cooperating. Since minute maneuver inside the oral cavity such as cutting will be required when implementing root canal treatment or filling treatment, due caution is required on moisture aspiration, as discussed in explanation for CQ2-2. If even these dental treatments are difficult, sufficient oral care should be provided on the teeth with residual roots periodically.

References

1) https://www8.cao.go.jp/kourei/whitepaper/w-2018/zenbun/pdf/1s2s_02_01.pdf

https://www8.cao.go.jp/kourei/whitepaper/w-2018/zenbun/pdf/1s2s_02_02.pdf

2) Kikutani T. et al. Tooth Stumps in Elderly Patients. Jpn J Gerodontol. 1993; 8(1): 47-52.

3) Nagaoka E. et al. A Cinical Survey of Overdentures. The Journal of the Japan Prosthodontic Society. 1982 ; 26(1): 85-97.

Strength of evidence

No evidence

Reliability based on literature

Reliability based on literature

C: There are no supporting reports.

CQ2-4 What measures should be taken if the patient has dental caries but cannot follow the direction to open the mouth due to dementia or disability?

CQ2-4	What measures should be taken if the patient has dental caries but cannot follow the direction to open the mouth due to dementia or disability?
Recommendation	In principle, it should be handled with oral care.
Explanation	[Background] The number of dementia patients shows a tendency to grow every year, with the estimated number being 4.62 million in 2013 and over 7 million in 2025[1]. While there are various different causes for dementia, the patients of Alzheimer's disease, which is the type of dementia with the largest number, from the level appropriate for age to the mild degree of progress under FAST classification[2] are often capable of following instructions to some extent thus can receive dental treatments. When they progress to the moderate degree, it may become difficult for them to receive minute dental treatments such as caries treatment, as behavioral and psychological symptoms of dementia (BPSD)[3] start appearing and they have difficulty in following instructions or holding the mouth open. [Explanation] It is often difficult to implement dental treatments such as caries treatment on patients who suffer from dementia or other disorders which make communication difficult. Even if caries treatment is necessary from the medical viewpoint of dentistry, it becomes difficult to implement the treatment if the patient cannot follow the instruction to open the mouth or hold the mouth open. Therefore, the basic approach here would be to take conservative measures such as oral care and prevent the symptoms from worsening as much as possible. In addition, it is acceptable to consider tooth extraction if the pain is evident, since tooth extraction is simpler compared to caries treatment. However, tooth extraction is of course an invasive treatment which comes with risks, and it needs to be determined upon

	consideration of the systemic conditions, status of drug administration, opinion of the physician in charge and so forth. It is also an acceptable treatment to apply diammine silver fluoride on the carious tooth. However, it is necessary to explain to the family in particular and obtain their consent in advance as applying it discolors the tooth to black.
References	1) http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000076236.html 2) Sclan SG, Reisberg B: Functional assessment staging (FAST) in Alzheimer′s disease: reliability, validity, and ordinality. Int Psychogeriatr 1992; 4 Suppl 1: 55-69. 3) Kato S. et al. Dementia Care Textbook. 3rd ed. The Japanese Society for Dementia Care. 51, 2013.
Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ2-5 Should root canal therapy be implemented in visiting dental care?

CQ2-5	Should root canal therapy be implemented in visiting dental care?
Recommendation	While it should be implemented if there are symptoms, whether to do so must be examined case by case based on the viewpoint of Quality of Life (QOL).
Explanation	[Background] There are no guidelines or clear standards for root canal therapy in visiting dental care. [Explanation] While there are no clear standards for root canal therapy in visiting dental care, one thing that can be clearly said is to prioritize the QOL. Even though it would be desirable to pursue what is appropriate in dentistry as a medical field during normal root canal therapy, this does not always apply to visiting dental care. Nevertheless, it is necessary to always consider which balance benefits the patient most, instead of completely ignoring what is appropriate in dentistry as a medical field. For example, the pain symptom leads to considerable decrease in QOL if there are acute symptoms, and pulp extirpation or treatment of infected root canal should be implemented, even though accuracy of treatment deteriorates considerably. On the other hand, handling with observation or occlusion adjustment instead of implementing root canal therapy should also be considered if the periapical lesion is asymptomatic or the symptom is mild. If the symptom is severe but it is impossible to implement minute treatments, tooth extraction, which is a simpler procedure, may be selected. Needless to say, tooth extraction should be selected upon thoroughly evaluating the risks regarding management of the entire body. It is also necessary to take practical measures that suit the primary disease which is the cause of requiring visiting dental care. For example, disorders such as cerebrovascular disorder sequela and dementia tend to make the

	management of oral cavity insufficient, thus allow caries to progress causing dental pulp symptoms. It is difficult to implement root canal therapy for patients of these disorders, as they tend to be difficult to communicate and unable to hold the mouth open due to attention deficits and so forth. While conservative measures such as oral care are often adopted if the symptoms of the tooth are mild, it would be necessary to act efficiently so that the treatment is completed in the shortest period possible or to consider tooth extraction, if treatment is absolutely necessary due to acute symptoms. Furthermore, if the patient has a respiratory disorder such as a chronic obstructive pulmonary disease, insertion of a rubber dam would also be difficult in practice. As described above, the contents of root canal therapy that is practical for each patient need to be examined case by case based on the characteristics of the disorder.
References	None
Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ2-6 Should periodontal treatment be implemented at home?

CQ2-6	Should periodontal treatment be implemented at home?
Recommendation	While naturally it should be treated if inflammation is observed in gingiva, it is required that measures should be taken within the possible range to suit the systemic conditions and situation of the patient.

[Background]

There are no guidelines or clear standards for periodontal treatments in visiting dental care.

[Explanation]

In 2008, "Home Dental Care Support Clinics" were newly established on medical service fees in order to promote home dental care, and "Lectures for training dentists for promotion of the health of teeth" also have been held as projects funded the Ministry of Health, Labour and Welfare. In recent years, many pieces of evidence data have also been published and showed that the health of the teeth and oral cavity contributes to the systemic health (see CQ10).

Provision of mouth cleaning instruction for patients who require nursing care to the care givers including family is part of periodontal treatments. Budtz, et al. examined the effects of mouth cleaning instructions by dental hygienists, and reported that the number of candida in oral mucosa and denture was reduced significantly in the group which was given mouth cleaning compared to a group without the cleaning[1)].

It is expected that elderly people deteriorate in resistance against periodontal disease due to decrease in immune functions in concurrence with aging. While there is no special method for periodontal treatments in elderly people, it is important to handle the treatment to suit the systemic conditions and situation of the patient[2)]. Therefore, it would be recommended that dental scaling be implemented if it is possible, but it is necessary that treatment be provided with consideration of the QOL of the patient, including scaling without inflicting pain while also communicating. It would also be better to examine

	measures to stabilize the disease state with supportive periodontal therapy (SPT) even if deep periodontal pockets are remaining.
References	1) Budtz-Jlrgensen E, et al. Oral candidosis in long-term hospital care: comparison of edentulous and dentate subjects. Oral Dis 1996; 2: 285-290. 2) http://www.perio.jp/publication/upload_file/guideline_perio_plan2015.pdf
Strength of evidence	D (very weak): The certainty for the estimated value of the effect is very low.
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ2-7 What measures should be taken if there is a considerably mobile tooth?

CQ2-7	What measures should be taken if there is a considerably mobile tooth?
Recommendation	Tooth extraction should be implemented if it is impossible to preserve the tooth and extraction is possible, and grinding and fixing should be considered if extraction is difficult. [Background] Mobility of a tooth increases if there is considerable alveolar bone resorption, or if there is an occlusal trauma. Occlusal traumas include primary occlusal traumas which occur on periodontal tissue due to excessive force applied to the teeth, and traumas occurring in teeth whose occlusal stress bearing capacity has deteriorated due to the progress in periodontitis and consequent decrease of alveolar bone, and they can be caused by physiological occlusal force[1)]. [Explanation] Regardless of the treatment being given in home care or not, tooth extraction must be considered if the tooth cannot be preserved. However, extraction may be difficult depending on the systemic conditions of the patient. Appropriate measures are desired if the QOL of the patient may be compromised, including pain caused by the presence of a mobile tooth which cannot be preserved. If tooth extraction is impossible, measures such as grinding and fixing with enamel bonding system should be considered. Occlusal adjustment is necessary if mobility is temporarily increased due to premature contact, cuspal interference and so forth.
References	1) http://www.perio.jp/publication/upload_file/guideline_perio_plan2015.pdf
Strength of evidence	No evidence

Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ2-8 Can it be considered that the systemic conditions will improve with periodontal treatment at home?

CQ2-8	Can it be considered that the systemic conditions will improve with periodontal treatment at home?
Recommendation	There are disorders such as diabetes which can be improved by improvement of the periodontal disease.

[Background]

Periodontal diseases are inflammatory infectious diseases which are caused by bacterial infection. While it is considered that an ulcer is formed inside a periodontal pocket with inflammation, the total area of the ulcer part in periodontal pockets would be 55 to 72 cm^2, which is a size equivalent to the palm of one's hand, if all the teeth are affected by chronic intermediate periodontitis of approximately 5 mm. It has been found that bacteria enter the bloodstream directly from the ulcer inside such periodontal pocket to cause bacteremia, and that the inflammatory cytokines increasing locally at the lesioned part of the periodontal disease go around the entire body hematogenously to raise the inflammatory cytokine levels of the entire body[1].

[Explanation]

While the consensus reports on the relationship between periodontal diseases and the systemic health by the Japanese Society of Periodontology[2,3] concluded that they did not have sufficient evidence on whether improvements in arteriosclerotic diseases can be expected by conducting periodontal treatments, they recommended that treatments be conducted for improvement of blood sugar control in diabetes and improvement of respiratory diseases such as pneumonia. Furthermore, the guidelines of the Japan Diabetes Society also recommend that periodontal treatments be conducted as it is possible that the blood sugar control may be improved in Type 2 diabetes patients through periodontal treatment[4]. Coordination between physicians and dentists is anticipated.

References

1) Page, RC. Pathobiology of periodontal diseases. Ann Periodontol 3, 108-120 (1998).

	2) https://minds.jcqhc.or.jp/docs/minds/periodontal-disease-in-diabetic-patients/periodontal-disease-in-diabetic-patients.pdf 3) http://www.perio.jp/publication/upload_file/guideline_perio_body.pdf 4) Japanese Clinical Practice Guideline for Diabetes 2016. The Japan Diabetes Society.
Strength of evidence	B (intermediate): There is intermediate certainty for the estimated value of the effect.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

[Case]

A case that was handled in home visits and that required treatments on multiple teeth is introduced below.
Patient: 82-year-old male
Name of disease: Alzheimer dementia, right femoral neck fracture
The patient had suffered Alzheimer dementia whose onset occurred 4 years before. He had more than 20 remaining teeth at the time and was capable of oral intake of normal food. However, many of the teeth fractured recently and some teeth became mobile. He had difficulty in implementing mouth cleaning by himself, and a request for care was made for the purpose of addressing oral cavity management including dental treatments.
Chief complaint: There was no chief complaint from the patient, but the family requested for dental treatment and oral hygiene management.
Problem: Although there were many remaining teeth, the patient had not been given continuous dental treatments or oral care.
Measures: Information was collected on the current systemic conditions, drugs for internal use and so forth from the physician in charge and the family, and the degree of progress in Alzheimer dementia was also confirmed. Dental treatments were provided within the possible range after evaluating the systemic conditions, and many teeth requiring extraction were extracted under admission at the dentistry department of a nearby hospital. Finally, partial denture was manufactured. In addition, methods of oral care were instructed to the caregivers including the daughter. Although the patient has a progressive disorder and it is expected that the situation will change sooner or later, he is currently capable of oral intake using the denture (Table 1).

Table 1: Progress for the case

Date	Progress	Measure and policy	Applicable CQ
At initial diagnosis BMI: 22.5 (normal body weight) Amount of	[Problems] (1) Alzheimer dementia	(1) The patient had difficulty in holding the mouth open even though he	(1) Caries treatment → See CQ2-2, 3, and 4.

nutrition: 1500kcal/day Oral intake level: Normal food	(2) Poor oral hygiene conditions (3) While there were many remaining teeth, there were 2 teeth with mild caries and 8 teeth with residual roots.  (4) 4 teeth were observed to be mobile.	was capable of opening the mouth, and it was difficult to provide complex dental treatments. (2) Instruction to the family on the methods of oral care (3) Caries treatment	(2) Oral care → See CQ2-4. (3) Caries treatment → See CQ2-2, 3, and 4.
28 days later BMI: 22.0 (normal body weight) Amount of nutrition:	(1) Improvement in oral hygiene conditions (2) Teeth with residual roots and mobile teeth	(4) Dental scaling treatment Treatment to fix the teeth	(4) Dental scaling treatment → See CQ2-6. Treatment to fix the teeth → See CQ2-7. (2) Tooth extraction → See CQ2-4 and 5.

1500kcal/day Oral intake level: Normal food		
	(1) Admission in dentistry department of a hospital	(2) While root canal therapy was possible for some of the teeth with residual roots if the patient had had normal systemic conditions, it was difficult to hold the mouth open for a long period due to dementia, and extraction of the teeth along with the mobile ones was considered.
41 days later BMI: 23.2 (normal body weight) Amount of nutrition: 1500kcal/day Oral intake level: Normal food	(1) Loss of tooth	
90 days later BMI: 21.5 (normal body weight) Amount of nutrition: 1500kcal/day Oral intake level: Normal food	(1) Although partial denture was installed, use was difficult due to pain. (2) Poor oral hygiene conditions	(1) Teeth with residual roots and mobile teeth to the total of 12 were extracted under hospital admission for 2 nights and 3 days.
123 days later BMI: 21.2 (normal body weight) Amount of	(1) The patient became used to the denture and learned to be able to use it.	

nutrition: 1500kcal/day Oral intake level: Normal food 145 days later BMI: 22.3 (normal body weight) Amount of nutrition: 1500kcal/day Oral intake level: Normal food	(2) Deposition of dental calculus was observed.	(1) Start of denture preparation (1) Continuation of denture adjustment (2) Provision of oral care instructions to the family again (1) While the form of diet and amount of oral intake did not change and the degree of satisfaction for the patient was assumed to be approximately the same, the	(2) SPT/maintenance → See CQ2-6.

family was satisfied.

(2)
Stabilization of the disease state was attempted with supportive periodontal therapy (SPT).

●Chapter 3: Prosthetic treatment

[Chapter 3: Significance of prosthetic treatment, Table of contents]

The oral cavities of the elderly we treat in visiting dental care have undergone various changes over the course of a long period. Not to speak of the changes in the conditions of remaining teeth, changes in the alveolar ridge can gradually deteriorate the fitting conditions of the dentures that are used. Furthermore, the masticating ability may deteriorate as the functions of the tongue and lips deteriorate. In the future, it is necessary to evaluate the functions and take measures, in addition to the evaluation of prosthetic devices and remaining teeth such as the conventional occlusal examination and denture base mucosal surface fitting test. That is, it may be necessary to coordinate with people in interprofessional collaboration such as registered dietitians, and examine the method of nutrient intake appropriate for the deteriorating functions, including proposal of specific dietary style, if it cannot be hoped that functions will be restored by dentures due to deteriorated oral functions and so forth, in addition to attempting so that the patient can eat properly by adjusting the denture appropriately. It is therefore surmised that the evaluation of oral functions by the dentist in team medicine would play an important role in setting up the treatment policy and the goals. Its necessity is thus expected to grow in the future. This section will explain the following questions based on these matters.

CQ3-1: What are the factors used to determine whether the use of denture is possible or not in visiting dental care? And is it better to repair or adjust the old denture rather than manufacture a new denture when it is to be used?
CQ3-2: Can the plate denture masticatory function test be implemented in visiting care?
CQ3-3: Should oral hypofunction be tested in visiting care?
CQ3-4: For what patients is palatal augmentation prosthesis (PAP) applicable in visiting dental care?

CQ3-1 What are the factors used to determine whether the use of denture is possible or not in visiting dental care? And is it better to repair or adjust the old denture rather than manufacture a new denture when it is to be used?

CQ3-1 What are the factors used to determine whether the use of denture is possible or not in visiting dental care? And is it better to repair or adjust the old denture rather than manufacture a new denture when it is to be used?

Recommendation

There are many patients with severe levels of dementia and nursing care requirements in the field of visiting dental care. In particular, many patients of severe and higher levels of dementia may not recognize denture, and communication is often difficult. It is therefore necessary to make a comprehensive judgment on the use of a denture while referring to ADL and so forth and taking into account the advantages and risks of using a denture as well as the nursing care environment for the management of the denture and assistance for mounting or removal.

Explanation

In addition, it is often more advantageous to repair and adjust the old denture rather than manufacture and install a new one if denture is to be used. If inevitably manufacturing a new one, a design which would compensate for the disadvantages of the current one and minimize the changes in its characteristics needs to be considered.

[Background]

It has been reported that restoring the masticatory functions with installation of denture delivers favorable effects on the patient physically and mentally. However, many dementia patients have difficulty in adapting, or cannot follow the instructions of the medical personnel, which makes it difficult to adjust or manufacture the denture. As a consequence, they may end up not using the dentures even if the dentures have been adjusted or manufactured. To minimize the physical and economic burdens of the patient in treatment and denture installation, it is necessary to carefully examine the acceptability of dentures at the time of treatment

policy development. If there is a defect in the denture that is currently being used, it should be handled by adjusting (with relief or occlusion adjustment) the old denture which is being used. Problems rarely occur after adjustment if the old denture is adjusted to improve the situation. However, it needs to be carefully done when manufacturing a new denture or making a considerable repair or adjustment on the old denture that would change its shape, as it may be impossible for the patient to adapt to the adjusted old denture or the new denture.

[Explanation]

The factors that lead to expectation that the rate of actually using the denture would be low even if a new denture is manufactured or a denture is adjusted for a dementia patient include the degree of dementia, and decrease in basic ADL (ability to guess the day and time, fluidity of language use, self-reliance for eating and changing clothes, etc.) and ADL related to the mouth (ability to rinse the mouth, mounting and removing the denture, and degree of self-reliance in oral hygiene management, etc.).

The reasons why dementia patients do not accept dentures include the following:

(1) The patient has difficulty in adapting to the new denture.

(2) Manufacture or adjustment of denture becomes hindered and the dentist cannot perform treatment well because the patient has difficulty in communicating, cannot follow the instructions of the medical personnel to open or close the mouth, and cannot properly express it even when they feel pain.

(3) The necessity for the patient to use denture has decreased as intake of soft food without the use of denture has become a habit.

On the other hand, it should not be judged that installation of denture or treatment is impossible only because the patient has dementia, but the willingness of the patient and wishes of the family should be asked, since there are many cases of severe cognitive disorder patients who use dentures or whose ADL were improved by use of dentures. The ability to manage the denture including the nursing care environment should be taken into consideration when examining the use of denture, as the patient may not be capable of sufficiently managing the denture.

The risks that are expected when the patient lacks in the ability to manage the denture are described below:

(1) The environment in oral cavity may deteriorate as the denture is left inside the mouth without cleaning for a long period and cause aspiration pneumonia.

(2) The patient may accidentally swallow the denture due to the severe cognitive disorder.

(3) The patient may lose the denture.

When dentures are used and the denture base is incompatible with the mandibular position, occlusal vertical dimension and occlusion being wrong and cannot be improved by adjustment, it is assumed that manufacture of a new denture is required (see the guidelines of Japan Prosthodontic Society[2)]). It is recommended to adjust or repair the old denture first as long as there is a denture which can be mounted and used, even though there is no certain basis to consider that repair and adjustment of the old denture would be more effective than manufacture of a new denture. If the subsequent situation required a new

denture, it is recommended to manufacture the new denture gradually while taking into account the severity of dementia and the degree of its progress and utilizing the characteristics of the current denture.

Fig. 1 shows the alveolar ridge of the upper jaw where denture ulcer had formed as the patient kept wearing an incompatible denture. The patient had not complained any pain even in such a condition. Since the patient felt restless unless he was wearing the old denture due to the effects of dementia, the old denture was repaired and adjusted.

Fig. 2 shows a state in which ulcer had formed due to the attachment inside the mouth as the patient suffered dementia. It is necessary to design a denture while considering points like this.

Figs. 3 and 4 show a patient who received visiting dental care with the complaint for "not being able to chew well." Observation of the oral cavity revealed that the clasp-anchored tooth for the denture had become lost, making the denture unstable. Using a denture in such a condition not only causes trouble in mastication but also comes with the risk of accidental ingestion of the denture.

If it is expected that the patient may feel restless or be unable to adapt to the changed shape of the denture as the old denture is repaired and its shape changed, it is possible to prepare a copy denture (dupe denture) and repair and adjust the copy (Figs. 5 and 6).

References

1) http://www.gerodontology.jp/publishing/file/guideline/guideline_20180625.pdf

2) http://www.hotetsu.com/s/doc/plate_denture_guideline.pdf

Strength of evidence

C (weak): The certainty for the estimated value of the effect is limited.

Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

Fig. 1: Denture ulcer

Fig. 2: Ulcer caused by the attachment inside the mouth

Figs. 3 and 4: Case for “not being able to chew well”

Figs. 5 and 6: Old denture and copy denture

CQ3-2 Can the plate denture masticatory function test be implemented in visiting care?

CQ3-2 Can the plate denture masticatory function test be implemented in visiting care?

Recommendation The masticatory function test is recommended for patients wearing plate dentures even in visiting care. However, implementation of an indirect test should be prioritized if there is a high risk of accidental ingestion or aspiration.

Explanation Subjective tests are strongly recommended as they also lead to the evaluation of the patient's diet and dietary support.

[Background]

Quantitative evaluation of the masticatory ability is practical and essential to the planning of prosthodontic treatments. Masticatory function tests are considered useful even in the field of visiting care for judgment of the necessity for prosthetic treatment, comparison of the states before and after the prosthetic treatment and so forth. On the other hand, many patients of visiting care have dysphagia or decreased cognitive functions and thus implementation of direct tests that use food materials and so forth comes with the risks of accidental ingestion or aspiration. It is therefore necessary to determine whether it is acceptable to conduct the testing upon sufficiently considering the safety. Indirect tests and subjective tests are recommended, as they are often feasible.

[Explanation]

Masticatory function tests include objective masticatory ability tests and subjective masticatory ability tests[1]. Objective masticatory function tests can be classified into direct test methods and indirect test methods.

Direct test methods use materials for mastication such as food. The sieve method using peanuts (Manly method), the masticatory performance test based on the amount of glucose elution (Fig. 1) and the evaluation with masticatory

performance score method (Fig. 2) using gummy jelly correspond to these test methods[2].

Indirect test methods include occlusal force measurement, measurement of occlusal contact, mandibular movement measurement, and measurement of the remaining teeth[2].

As subjective tests, questionnaire methods such as masticatory function evaluation table[3] (Fig. 3) and Dietary Variety Score[4] (Fig. 4) are popularly used. In addition, Visual Analogue Scale (VAS) method and face scale[5] (Fig. 5) are also used.

Since there are many patients with dysphagia and decreased cognitive functions in visiting care, it is necessary to evaluate the safety first, for example by using the screening tool for swallowing functions, before using a direct test method. Indirect test methods are recommended since some of them, such as the measurement of remaining teeth and occlusal contact evaluation, can be implemented as long as the patient is capable of cooperating to some extent.

Subjective evaluation can not only be implemented safely but also deliver an understanding of the wishes of the patient and their family and lead to sharing of the goal. As the subjectivity of the patient can be converted into numerals, it can also be used for evaluation before and after prosthetic treatment, or applied in judgment on function deterioration over time.

References

1) http://www.hotetsu.com/s/doc/Guidelines.pdf

2) Minakuchi S. et al. Deterioration of Oral Function in the Elderly, The Position Paper from Japanese Society of Gerodontology in 2016. Jpn J Gerodontol. 31(2): 81-99, 2016.

3) Sato Y. et al. The Aspect of Dietary Intake of Full Denture Wearers. J Jpn Prosthodont Soc, 32: 774-779, 1988.

4) Shinka S. et al. 142th Public Lectures on Geriatric Medicine, Tokyo, 2016, May.

5) Lorish CD et al. Arthritis Rheum, 1986.

Strength of evidence	Strength of evidence C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

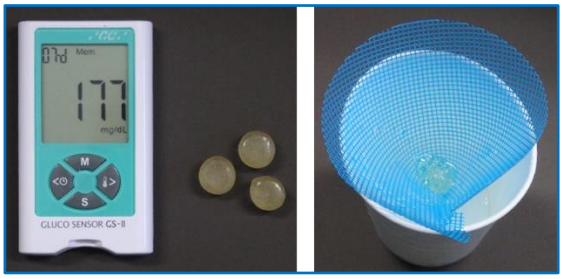


Fig. 1: Example of masticatory performance test based on the amount of glucose elution

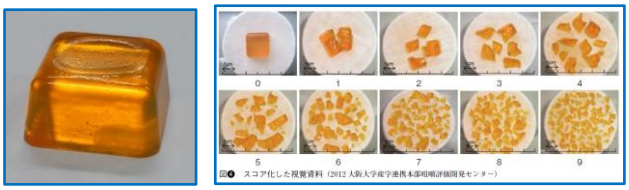
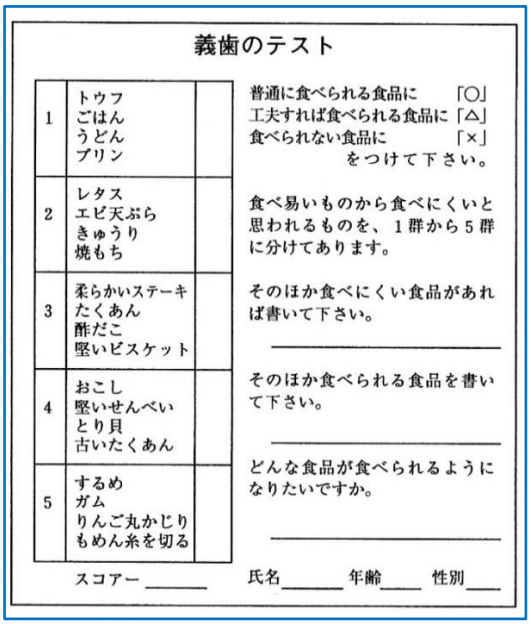


Fig. 2: Gummy jelly and score sheet used in evaluation adopting masticatory performance score method



義歯のテスト

1	トウフ ごはん うどん プリン	
2	レタス エビ天ぷら きゅうり 焼もち	
3	柔らかいステーキ たくあん 酢だこ 堅いビスケット	
4	おこし 堅いせんべい とり貝 古いたくあん	
5	するめ ガム りんご丸かじり もめん糸を切る	

スコアー _____

普通に食べられる食品に 「○」
工夫すれば食べられる食品に 「△」
食べられない食品に 「×」
をつけて下さい。

食べ易いものから食べにくいと思われるものを、1群から5群に分けてあります。

そのほか食べにくい食品があれば書いて下さい。

_____

そのほか食べられる食品を書いて下さい。

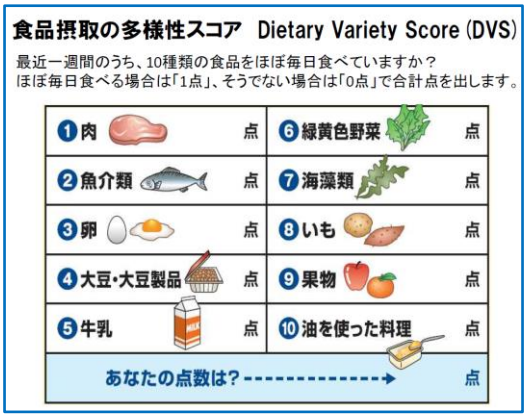
_____

どんな食品が食べられるようになりたいですか。

_____

氏名_____ 年齢____ 性別___

Fig. 3: Masticatory function evaluation table by Sato, et al. (in japanese)



食品摂取の多様性スコア Dietary Variety Score (DVS)

最近一週間のうち、10種類の食品をほぼ毎日食べていますか？
ほぼ毎日食べる場合は「1点」、そうでない場合は「0点」で合計点を出します。

❶肉	点	❻緑黄色野菜	点
❷魚介類	点	❼海藻類	点
❸卵	点	❽いも	点
❹大豆・大豆製品	点	❾果物	点
❺牛乳	点	❿油を使った料理	点
あなたの点数は？----------→	点		

Fig. 4: Dietary Variety Score (in japanese)

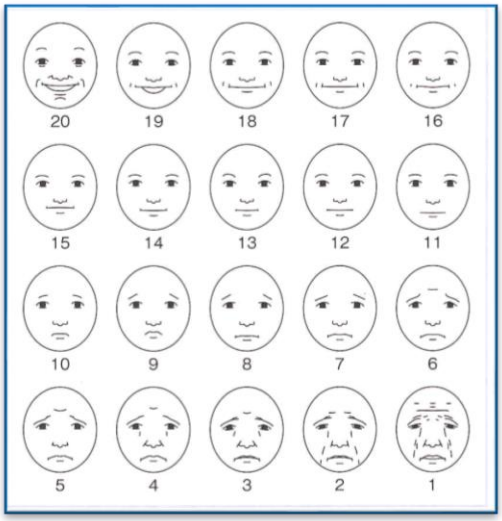


Fig. 5: Example of face scale

CQ3-3 Should oral hypofunction be tested in visiting care?

CQ3-3	Should oral hypofunction be tested in visiting care?
Recommendation	For patients suspected to have oral hypofunction under visiting care, oral hypofunction test (detailed examination of oral cavity functions) is recommended.
Explanation	[Background] Oral hypofunction test (detailed examination of oral cavity functions) is implemented for the purpose of diagnosing oral hypofunction in patients suspected to have oral hypofunction[1], and it does not depend on the form of care such as outpatient or visiting care. Therefore, detailed examination of oral cavity functions is recommended for any patients of visiting care who are suspected to have oral hypofunction. However, patients with disability levels such as dysphagia are not considered candidates for oral hypofunction and thus they are not subject to detailed examination of oral cavity functions whose purpose is to diagnose oral hypofunction. [Explanation] Oral hypofunction is a "disorder in which the oral cavity functions are decreased in a composite manner due to not only aging but also other various causes such as disorders and disaiblities"[1], and it is considered a stage before reaching functional disorders of the mouth such as dysphagia (**Fig. 1**)[2, 3]. There are 7 lower items for oral hypofunction. These are (1) Poor oral hygiene conditions, (2) Dry mouth, (3) Decreased occlusal force, (4) Decreased motor functions in tongue and lips, (5) Low tongue pressure, (6) Decreased masticatory functions, and (7) Decreased swallowing functions. There is a test for each of these 7 lower items. A patient is diagnosed with oral hypofunction when it is determined that decrease is observed in 3 or more of the 7 items.

Many patients of visiting care have decreased swallowing functions and cognitive functions. Since gummy jelly is used in the test on decreased masticatory function, which is one of the lower items, caution is required on aspiration, suffocation and so forth. It is necessary to implement it after evaluating the safety, for example by using a screening tool for swallowing functions in advance if necessary.

Furthermore, caution is required on judgment of the test results for patients with reduced cognitive functions or dementia, as they may have insufficient understanding on testing.

As described previously, oral hypofunction is a disorder at the stage before the disability level, and thus patients diagnosed to have dysphagia are not applicable. Therefore, they are subject to detailed examination of oral cavity functions, which is implemented for the purpose of diagnosing oral hypofunction, either.

However, we do not deny the implementation of detailed examination of oral cavity functions since some of the individual tests included in it are also considered useful for patients of the disability levels. The decision to implement the tests should be made individually depending on the symptoms, disorder and so forth.

References

1） https://www.jads.jp/basic/pdf/document_02.pdf
2）http://www.hotetsu.com/s/doc/Guidelines.pdf
3）Minakuchi S. et al. Deterioration of Oral Function in the Elderly, The Position Paper from Japanese Society of Gerodontology in 2016. Jpn J Gerodontol. 31(2): 81-99, 2016.
4）Ueda T. et al. Evaluation and Diagnostic Criteria for Oral Hypofunction: -Interim Report for Prospective Revision-. Jpn J Gerodontol. 33(3): 299-303, 2018.

Strength of evidence

Strength of evidence
C (weak): The certainty for the estimated value of the effect is limited.

Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

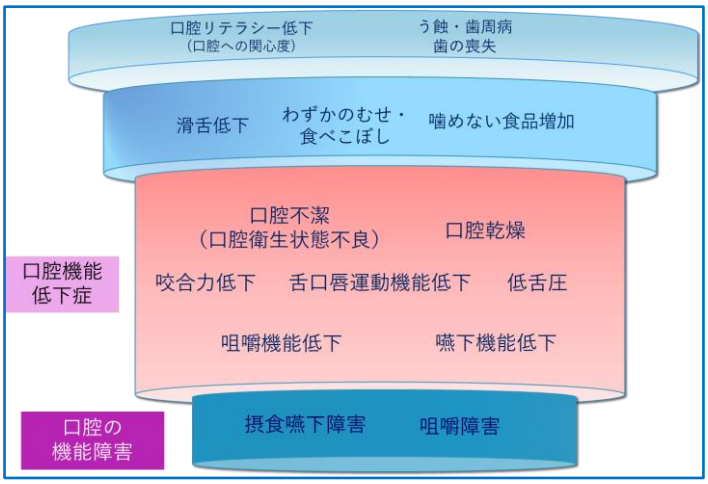


Fig. 1 Conceptual diagram of oral hypofunction (in Japanese model)

CQ3-4 For what patients is palatal augmentation prosthesis (PAP) applicable in visiting dental care?

CQ3-4 For what patients is palatal augmentation prosthesis (PAP) applicable in visiting dental care?

Recommendation It is mainly applicable to patients of eating disorder/dysphagia caused by cerebral apoplexy, neuromuscular diseases, and surgery on cancer in the head and neck region.

Explanation

Palatal Augmentation Prosthesis (hereinafter referred to as PAP) is a prosthetic device which is prepared for the purpose of improving the articulation or eating disorder/dysphagia (especially the oral stage). The subject is patients of eating disorder/dysphagia caused by cerebral apoplexy, neuromuscular diseases, or surgery on cancer in the head and neck region. Its form is shaped by thickening the tongue and the palatal part to suit the functions of the patient. Either the palatal part of the maxillary denture is thickened (Fig. 1) or the palatal plate is prepared if there is no lack of maxillary dentition (Fig. 2). For details, please refer to the clinical practice guidelines on Palatal Augmentation Prosthesis (PAP) for eating disorder/dysphagia and articulation disorder, edited by the Japanese Society of Gerodontology and Japan Prosthodontic Society[1)].

(The article prepared by mastication group of this study group was cited above.)

●Introduction of cases

Case 1: An approach for movement disorder due to cerebrovascular disorder sequela

An 85-year-old male. He suffered movement disorder in the muscles surrounding the oral cavity on the right side and the tongue caused by cerebral hemorrhage (Figs. 3 to 5). Due to the severe movement disorder in the muscles surrounding the oral cavity, the swallowing functions were not improved even

though rehabilitation with ST was attempted, and dental care was requested. The old denture was repaired and adjusted to prepare a PAP (Figs. 6 to 8). This improved the lip closing performance and the state of tongue contact.

Installation of PAP improved the lip closing performance and tongue contact, as well as residual food in the pharynx after swallowing (Figs. 9 and 10). It also reduced the time taken to send the food into the throat by making the sending movement of the tongue smoother, and improved saliva aspiration during meals.

Case 2: An approach for low tongue pressure

A 90-year-old female. She received visiting dental care with the chief complaint for not being able to swallow things. There was no aspiration when a swallowing function screening test (water drinking test) was conducted. However, observation of meals showed that she was unable to swallow and ended up spitting the food out after a while. Tongue pressure test was therefore conducted, and she was found to have a low tongue pressure of 7.6 kPa. Dietary style was adjusted and instructions on oral cavity rehabilitation such as tongue training were given to make observation 1 month later. Since the symptoms were not improved, the denture that was being used was repaired and adjusted to install a PAP. Gradual improvement in tongue pressure was observed after installation of PAP, with the amount of food intake and types of food that could be eaten also improving. At present, the tongue pressure has recovered to 25.6 kPa, and the patient is showing good progress. It is possible that the patient was unable to use the training tools well in this case, since the tongue pressure at initial diagnosis had been too low. It is surmised that installation of PAP improved the tongue contact at swallowing, which delivered a similar effect as the loading training on the tongue (Figs. 11 to 14).

The palate shape is still being adjusted at present to suit the

improvement in tongue functions.

References	1) http://minds4.jcqhc.or.jp/minds/pap/pap.pdf
Strength of evidence	Strength of evidence C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

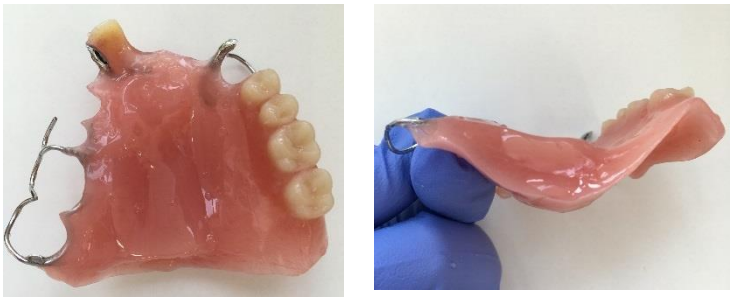


Fig. 1: PAP to thicken the palatal part of maxillary denture (re-posting)

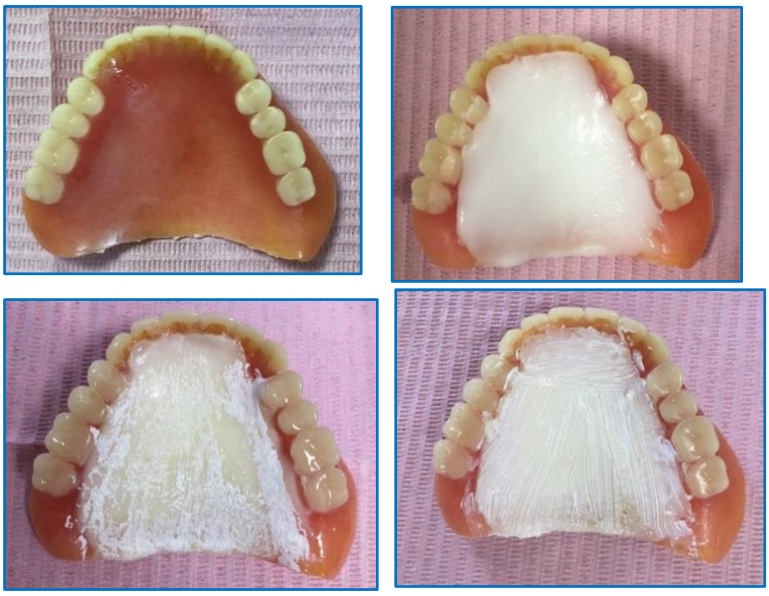
Fig. 2: PAP for palatal plate

Fig. 3: Severe movement disorder was observed on the right side of the face

Figs. 4 and 5: Comparison of the position to take the spoon in the mouth before and after PAP installation (Left: Before installation, Right: After installation)

Figs. 6 to 8: The old denture that was used (Left) and the denture that was repaired to PAP (Center and Right)

Figs. 9 and 10: How food remained at the pharynx after swallowing without PAP installed (Left) and with PAP installed (Right)



Figs. 11 to 14: Current denture and PAP (Top left: The denture being used, Top right, Bottom left and Bottom right: After PAP installation)

[Case]

A case which achieved recovery with denture treatment to improve the dysphagia caused by masticatory disturbance, along with oral function tests followed by implementation of appropriate rehabilitation is introduced below.

Patient: 72-year-old female
Name of disease: Cerebral infarction

Outline of the case:

Chief complaint: Desire to improve the style of diet
Problems: Movement disorder in the muscles surrounding the oral cavity and the tongue and concurrent dysphagia caused by cerebral infarction sequela
Masticatory disturbance due to loss of multiple teeth
Measures: Denture treatment was implemented in order to improve the masticatory disturbance caused by loss of teeth, and oral function tests and appropriate rehabilitation were implemented for improvement of the style of diet.

Date	Progress	Measure and policy	Applicable CQ
At initial diagnosis Eating paste food only by oral intake.	[Problems] Incapable of masticating due to the loss of multiple teeth on the upper jaw. Thus the patient cannot chew and swallows the food whole if solid food is given. It poses	To adjust the old denture which could not be used due to pain and make it usable. To restore the occlusion by enabling the use of denture.  The patient has movement disorder on the left side of the face due to cerebral infarction	CQ3-1

	the risk of not only aspiration but also suffocation and so forth, and the dietary form is paste food only.	sequela. Although multiple teeth had been lost from the oral cavity, the patient wished to eat normal food instead of paste food and had repeated choking on the food frequently.	
14 days later	VE test was conducted after adjusting the denture and the patient learned to use it. It was assumed that the patient could not form the bolus well due to the dysfunction of the oral cavity (especially the muscles surrounding the oral cavity and the tongue).	The current state of the oral functions was checked by conducting oral function tests, and the necessary rehabilitation was implemented.  Old denture which became usable by adjustment Since strong movement disorder in the tongue movements was observed in this case, tongue rehabilitation and so forth (tongue loading training, training on the range of tongue motion) were requested to the ST.	CQ3-2,3

Scene from rehabilitation on the muscles surrounding the oral cavity

60 days later	While the tongue movement functions were improved by rehabilitation of the muscles surrounding the oral cavity, the tongue movement disorder caused by the sequela was still considerable, and dysphagia caused by the food residue in the mouth and deterioration in the swallowing pressure were observed.	The palate shape of the old denture that was being used was adjusted to make it into a PAP. This improved the tongue contact state of the palatal surface of the denture and improved the swallowing conditions.	CQ3-4

State of the oral cavity after swallowing prior to PAP
A large amount of food residue is observed in the palatal part and the palatal side of the anterior teeth.

		 The denture repaired into a PAP and the state of the oral cavity after swallowing The conditions of food residue were improved.
90 days later	Creation of social participation	As the use of denture became possible, masticatory disturbance, which had been the chief complaint, was improved and the problem regarding meals was solved. In addition, the anterior teeth were mended with prosthetics, solving the aesthetic problem and making the patient feel no pain in participation of day service and conversation with other users of day service. As opportunities for conversation and social participation increased, the oral cavity functions including the muscles surrounding the oral cavity improved, and clarity of speech also improved.

●Chapter 4: Oral surgery

[Chapter 4: Significance of oral surgery, Table of contents]

When it becomes difficult to receive care from dentist clinics due to the state requiring nursing care, teeth that need treatment may cause bacterial infection or an infectious disease for the entire body. In visiting dental care, it may become necessary to implement oral surgery treatments in order to determine the state of the patient from the viewpoint of systemic health management in concurrence with the cognitive functions and background diseases and prepare the oral environment which is easy for the patient and care giver to manage. However, the circumstances and environment for visiting care must be taken into consideration in providing the operation. Since visiting care has environment different from that of dental clinics which are well equipped and many of the patients are elderly people with multi-morbidity, it is feared that unexpected circumstances may occur unless the system of management during and after surgery has been established. It is therefore necessary to grasp the medical history and the medicines being taken and coordinate with interprofessional collaboration members concerned with the management of the overall health of the patient, in addition to the confirmation of health conditions and vital signs. It is important to collect sufficient information from not only the patient but also his/her family members, physician in charge of the patient, about underlying diseases and drugs prescribed, support system and so forth, and establish close coordination with the supporting hospital. Based on these matters, this section explains the following questions which are often faced in relation to oral surgery in visiting dental care:

CQ4-1: How far is oral surgery treatment adaptable in visiting dental care?

CQ4-2: How do we manage the risks of oral surgery treatment in visiting dental care?

CQ4-3: Is preventive administration of antibacterial drugs effective when providing oral surgery treatment on a patient who is on steroids?

CQ4-4: How do we prevent infectious endocarditis (IE) in high-risk cardiac disease patients in visiting home care?

CQ4-5: How do we implement tooth extraction on a patient taking an anticoagulant or antiplatelet drug in visiting dental care?

CQ4-6: How do we treat a patient on a bisphosphonate-based drug (BPs-based drug) in visiting dental care?

CQ4-7: What types of monitoring are useful for providing oral surgery treatment in visiting dental care?

CQ4-1 How far is oral surgery treatment adaptable in visiting dental care?

CQ4-1	How far is oral surgery treatment adaptable in visiting dental care?
Recommendation	Surgery that requires high skill levels, accuracy and strict sterilization processes (flap operation, etc.) does not apply. Measures should be taken with consideration of urgency and post-surgery invasiveness if it is determined that it may be a cause of dental infection or infectious disease for the entire body.
Explanation	[Background] There are reports on cases in which teeth requiring treatment that became worse resulted in dental infection or infectious disease for the entire body since the patient had gone into a state requiring nursing care and had become difficult to receive care of a dental clinic thus left the oral cavity unattended. It may become necessary to conduct oral surgery in order to establish the oral cavity environment which is easier for the patient and the care givers to manage by judging from the viewpoint of systemic health management in concurrence with the cognitive functions and background disorder even in visiting dental care. However, the situation and environment of visiting care must be taken into consideration before conducting the surgery. [Explanation] Surgery that requires high skill levels, accuracy and strict sterilization processes (flap operation, etc.) does not apply in the range of feasible oral surgery in visiting dental care. That is, surgery in visiting dental care is said to include simple

teeth extraction, orthopedic surgery of alveolar ridge, reduction in inflammation in oral cavity by alveolar abscess, reduction in inflammation outside the oral cavity, and non-invasive treatment on jaw dislocation[1,2]. Furthermore, the cases in which implant structures that became mobile due to peri-implantitis are removed with consideration of the risks of infection are also possible. However, procedures at the dentistry department or oral surgery department of a hospital should be recommended without hesitation if it is judged that treatment in a facility with necessary equipment is desired based on comprehensive consideration of the disease state, cognitive functions and so forth of the patient.

It is desired that visiting dental care is provided during the period when the conditions of the patient are stable. While the necessary period of 1 visit varies depending on the conditions of the patient, it is considered that 30 minutes to 1 hour would be appropriate. The frequency of care also varies depending on the description of treatment, but it should normally be approximately once a week if the patient is stable. In addition, even a procedure which would end within 30 minutes such as postsurgical one should not be repeated unnecessarily[1,2].

The most frequent cases in oral surgery procedures in visiting dental care are teeth extraction. The adaptation level of patients who require nursing care for teeth extraction does not vary much from a self-reliant adult. However, it is necessary at present to examine its feasibility while including the ability to receive dental treatments (degree of understanding on necessity for treatment, acceptance when a new denture is installed, etc.), ADL, and living environment

(frequency of receiving dental care, etc.) as matters to be considered. While tooth extraction is considered adaptable in dentistry as a medical field for teeth whose preservation or repair procedure is impossible due to significant progress in caries, teeth which are considerably mobile, and teeth that repeat acute inflammatory symptoms[3] and so forth, the primary work of a dentist is to preserve the teeth and we should be cautious not to easily adapt teeth extraction[3]. Even though there are reports on elderly patients with dementia who suffered pneumonia as a result of aspirating a tooth that fell off naturally[4], there are also reports in which unidentified fever was improved by extraction of untreated teeth[5]; indicating that worsening in oral cavity environment has to be examined as a cause of infection which may affect the entire body. In addition, injury of oral mucosa (erosion, ulcer, cuts, abrasion, etc.) caused by remaining teeth also occurs often, even though the literature to be used as basis cannot be found. It may be necessary to consider adaptation of teeth extraction in order to protect the mucous membrane in such cases.

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Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ4-2 How do we manage the risks of oral surgery treatment in visiting dental care?

CQ4-2	How do we manage the risks of oral surgery treatment in visiting dental care?
Recommendation	When a patient is at a high risk of infection or is taking multiple drugs due to comorbidity, sufficient information should be collected on the basic disorder, drugs that are prescribed, support system and so forth from the family and the physician in charge in addition to the patient while expecting measures against infection after the procedure and the effects of drugs on wound healing. It is also necessary to establish close coordination with the support hospital.
Explanation	

[Background]

As the number of elderly people who require nursing care grows, the opportunities where oral surgery procedures are conducted in visiting dental care are also increasing. Since visiting care has environment different from that of clinic offices which are well equipped, and the patients are elderly people with multi-morbidity, there are concerns that unexpected situations may occur unless the system for management during and after surgery has been established. It is therefore necessary to establish coordination among the interprofessional collaboration members related to the systemic health management of the patient as well as the support system, in addition to grasping of the medical history and the internal drugs that are being taken.

[Explanation]

Patients who require visiting dental care often have various comorbidities (multi-morbidity). Similar to treatments in

clinic offices, the JAID/JSC Guide to Clinical Management of Infectious Diseases[1)] can be used for reference in preventing infection if the patient is at a high risk of infection due to diabetes or infectious endocarditis, or if the patient has artificial parts such as artificial joint inserted. In addition, it is desired that the risk of bleeding should be considered with reference to the Guidelines on tooth extraction in patients of antithrombotic therapy based on scientific grounds[2)] if the patient is receiving antithrombotic therapy due to venous thromboembolism, atrial fibrillation and so forth. It is also necessary to check the drugs that are being prescribed as there are many patients who take multiple drugs. For patients who require nursing care, deterioration in medication management ability or medication adherence tends to occur, and they often fail to observe the instructions on medication[3-5)]. The drugs that requires special caution in surgical procedure are the drugs for osteoporosis treatment (bone absorption inhibitors)[6)]. While the first selection for treatment is normally oral formulation, it is necessary that the patient has empty stomach before and after administration, and that the patient's upper body is raised for 30 to 60 minutes even after administration. Injection should therefore be selected in cases where the patient's cognitive functions have deteriorated[7-10)]. Since injections may not always be described on individual medication notebook, and they may be done at the administration interval of once in half a year[9)], interview on medication history while assuming injection is necessary. In addition, medication information should be checked and measures taken, as use of anti-RANKL antibody formulations, not limited to bisphosphonate formulations with bone resorption inhibition effect, also may result in osteonecrosis of

the jaw in some cases[11].

What is most necessary and important in management of visiting dental care is how to handle dementia. It must be noted that behavioral and psychological symptoms of dementia (BPSD) may occur in dementia patients under stimulation of pain or environmental change as they have emotional lability or irritability. It is necessary to take the measures in advance while taking into account that unexpected body motion may occur during the procedure under stimulation or pain of the procedure and that interruption of the procedure may become inevitable. If cooperation cannot be ensured by the behavior management method, providing the treatment in an environment where the entire body can be managed without force should be considered. Regarding pain management after the procedure, consideration of the interaction with other internal drugs as well as digestive symptoms, liver dysfunction and renal dysfunction is inevitable before using a pain reliever[12]. Furthermore, preparation must be made for hemostasis using insertion of local hemostasis material, tight stitching, hemostatic plate installation and so forth as measures to handle bleeding after the procedure, if the patient has difficulty in following instructions such as to bite down on gauze and hemostasis cannot be addressed by astriction.

Collection of sufficient information on the basic disorder, drugs that are prescribed, support system and so forth from not only the patient but also the family and the physician in charge is essential in conducting oral surgery procedure during visiting dental care[13]. If life-saving is necessary due to a sudden change in the systemic conditions, one must not hesitate to transfer the patient to a designated emergency

hospital on an ambulance. If there is inflammation, trauma, tumor and so forth and bleeding that may be life-threatening is expected, transfer to or close coordination with the support hospital should be ensured instead of trying to handle everything in visiting care.

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Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ4-3 Is preventive administration of antibacterial drugs effective when providing oral surgery treatment on a patient who is on steroids?

CQ4-3 Is preventive administration of antibacterial drugs effective when providing oral surgery treatment on a patient who is on steroids?

Recommendation There are many frail elderly patients in visiting dental care, and they are susceptible to infection as they more or less show delayed wound healing and immunosuppression under steroid medication. Although we find no report which specifically examined the effectiveness of preventive administration of antibacterial drugs on postoperative infection in oral surgery procedure, it is recommended that preventive administration of antibacterial drugs should be implemented in order to prevent postoperative infection.

Explanation

[Background]

For patients in home care, unlike inpatients, the medical history may not be conveyed or the internal medicine may not be managed thoroughly. There are also many cases in which the use of steroid drugs cannot be grasped sufficiently, since many patients are elderly people with dementia who are difficult to communicate with. It is necessary to examine the appropriateness of antibacterial drugs by thoroughly collecting information especially for oral surgery procedures, as the failure to confirm steroid medication may result in the advance in the existing disorder or a serious infectious disease.

[Explanation]

Long-term medication with steroid drugs causes the biophylactic functions against infection to deteriorate, and thus there is a risk of aggravation of any infection focus that had existed before the surgery, easily making the infectious disease occurring after a surgery more intractable[1)]. Therefore, it would be necessary to implement sufficient anti-inflammation measures against the infection foci that exist

before surgery using antibacterial drugs and post-surgery administration of antibacterial drugs over a relatively long period if oral surgery is to be conducted on a patient who have been medicated with this drug for a long period[2]. In general, the dose for prevention of infection after tooth extraction is approximately 1.5 times the normal dose[3], and the effective administration period is said to be 3 days or more, including administration before surgery[4].

However, 3 days should be considered the guideline period for judging the effects of antibacterial drugs on dental infection, and addition of surgical anti-inflammation procedures or change to a different drug should be considered if the inflammation aggravates, as an aimless use of antibacterial drugs for long periods will lead to the appearance of drug-resistant bacteria. American Academy of Periodontology specifies the administration period for each antibacterial drug for dental infection as approximately 8 days[5].

It is also necessary to give instructions on the patient and the family regarding the methods of oral care so that they can manage the wound to be as clean as possible after the surgery.

Although there is no report on comparative studies with high evidence that studied the effectiveness of antibacterial drug administration before surgery to prevent postoperative infection in patients under steroid medication, the degree of recommendation can be surmised from several related reports which show high evidence as follows:

(1) According to the recommendation of the U.S. Centers for Disease Control and Prevention (CDC), possibility of steroid use is included in the risk factors for surgical site infection (SSI)[6].

(2) While the effectiveness of preventive administration of antibacterial drugs for wisdom tooth extraction on postoperative infection and dry socket has been shown in systematic review, it is also reported that the decision on administration should be made carefully as recommending it would result in healthy individuals being administered just for

the same of a few patients. At the same time, they mention the necessity of preventive administration of antibacterial drugs when it is comprehensively assumed that the immunity is weakened[7].

(3) Long-term administration of steroids is a risk factor for the onset of BRONJ, and preventive administration of antibacterial drugs is recommended[8].

(4) While the risk of suffering a severe sequential infection is considered low when steroid treatment is Predonine administration of 10 mg/day or total dose smaller than 700 mg, they also suggest that the basic disorder itself should also be taken into account [9].

Based on the above, patients under steroid administration are considered susceptible to infections, and prevention of infections with antibacterial drugs needs to be considered when conducting a surgical procedure. Furthermore, regarding the selection of the antibacterial drug, amoxicillin (Sawacillin®, etc.) should be the first choice for mild to intermediate dental infection by assuming that the pathogenic bacterium is a streptococcus, clindamycin (Dalacin®, etc.) or azithromycin (Zithromax®, etc.) should be selected for patients with mild to intermediate dental infection who are allergic to penicillin, depending on the situation. For severe dental infection, a penicillin antibiotic with beta-lactamase inhibitor should be selected, as the detection frequency for aerophobic bacteria is high and beta-lactamase production rate is also high. In addition, it is necessary that sufficient information is collected on the basic disorder, drugs that are prescribed, support system and so forth from not only the patient but also the family and the physician in charge when the patient is under steroid medication, as sufficient consideration needs to be made regarding the basic disorder for which the steroid is prescribed.

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Strength of evidence	C (weak): The certainty for the estimated value of the effect is
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ4-4 How do we prevent infectious endocarditis (IE) in high-risk cardiac disease patients in visiting home care?

CQ4-4

How do we prevent infectious endocarditis (IE) in high-risk cardiac disease patients in visiting home care?

Recommendation

In visiting dental care, preventive administration of antibacterial drugs for infectious endocarditis (IE) is recommended prior to the procedure of oral surgery such as tooth extraction, which may induce bacteremia, , for high risk patients who tends to develop severe infection.

Explanation

[Background]

It has been pointed since long ago that IE is induced by bacteremia caused by oral surgery[1)], and preventive administration of antibacterial drugs for IE when implementing a procedure in oral surgery has been recommended in guidelines since the 1950s[2)]. However, we do not have strong evidence on preventive administration of antibacterial drugs. It was concluded in the Cochrane Review of 2013 that they did not observe evidence on preventive administration of antibacterial drugs[3)]. Meanwhile, people have expressed concerns for allergy onset and appearance of resistant bacteria due to administration of antibacterial drugs. There are many patients who have cardiac diseases among the elderly patients under home care who receive visiting dental care, and it may be feared that they are susceptible to infection and develop severe infection after oral surgery. It is therefore necessary to examine the measures that can be taken during visiting dental care in order to prevent the onset of IE in particular.

[Explanation]

Reviews on antibacterial drug administration during dental treatments have been conducted in the U.S. and European countries since the 2000s[2,4,5]. It has become common to regard that the patients of cardiac diseases can be classified into the high risk group who are likely to suffer serious results such as death in case of IE onset and intermediate risk group who are not[2,4,6].

Since bacteria which enter the blood is quickly removed from the blood by reticuloendothelial systems such as the liver and become mostly eliminated in several minutes, it is called "transient bacteremia." The rate of bacteremia onset is nearly 100% for tooth extraction[7]. It is known that the rate of bacteremia onset after tooth extraction decreases by administration of antibacterial drugs[8]. Once IE onset occurs, it may result in hospital admission, surgery, cerebral infarction or even death, and the effect on the individual patient is considerable. While the possibility of suffering a serious result is low in the intermediate risk group even if IE onset occurs, it is desired that the decision on preventive administration should be made upon discussing it with the patient in each case. Since the antibacterial drugs suppressed the onset of IE even though they did not affect the bacteremia after tooth extraction, it is assumed that the point of action for antibacterial drugs lies in suppression of the ability of the bacteria to adhere and prevention of the multiplication of the adhering bacteria[9,10]. Whether the bacteremia immediately after tooth extraction can be reduced is not the only ground for determining the type or amount of antibacterial drug administration.

As selection of antibacterial drugs, AHA suggests single administration of an oral drug so that it is easy to administer at a dentistry department[2], and especially recommends 2 g of amoxicillin as it can deliver blood concentration comparable to intramuscular administration by oral administration and maintain the effect for a long period. Since the peak of blood concentration as well as the duration are considered important, “Practical guidelines for proper use of antibacterial drugs for prevention of postoperative infection” recommends intravenous drip infusion of 1 g ampicillin in addition to the oral administration of 2 g amoxicillin[11]. Of the oral cephem antibiotics often used by dentists, cephalexin and cefaclor have good blood transfer concentration. However, their sensitivity to oral streptococci has already been decreasing since the first half of the 1990s. On the other hand, cefditoren, pivoxil and so forth, which are prodrugs, have good drug sensitivity to oral streptococci, but are not appropriate as antibacterial drugs for IE prevention since they do not increase its blood concentration to the enough level and cannot ensure sufficient blood concentration and duration. It is also important to ensure thorough IE prevention through maintenance of oral hygiene other than antibacterial drug administration.

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Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ4-5 How do we implement tooth extraction on a patient taking an anticoagulant or antiplatelet drug in visiting dental care?

CQ4-5 How do we implement tooth extraction on a patient taking an anticoagulant or antiplatelet drug in visiting dental care?

Recommendation Tooth extraction while continuing warfarin administration or antiplatelet therapy is recommended. It is also necessary to conduct the hemostasis procedure securely and confirm coordination with the support hospital.

Explanation

[Background]

Medical history of myocardial infarction and atherothrombotic cerebral infarction are often observed in elderly patients under home care. It is assumed that arterial thrombosis caused by activation of platelets under an environment with fast bloodstream is the main disease state. Therefore, antiplatelet drugs are effective in prevention of these disorders. On the other hand, it is assumed that venous thrombosis caused by the activation of coagulation factors under the environment with stagnating blood stream is the main disease state for deep vein thrombosis, pulmonary embolism, and cardiogenic embolism. Anticoagulants are therefore used to prevent the onset of these diseases. When conducting oral surgery procedure that involves bleeding in visiting dental care, it is necessary that the medical history and internal medicines (antiplatelet drugs or anticoagulants) are checked and that the dentist is proficient in hemostatic techniques to handle the bleeding after the procedure.

[Explanation]

In principle, tooth extraction while continuing warfarin

administration or antiplatelet therapy is recommended[1,2]. If warfarin administration is stopped, the onset of serious thromboembolism may occur at the frequency of approximately 1%[3,4]. It has been indicated that thromboembolism may be induced as the coagulating system is accelerated in a transient manner in what is called the rebound phenomenon if anticoagulant therapy is suddenly stopped[5]. While there are different opinions on this rebound phenomenon, at least the possibility that the hypercoagulable state which each patient has had before introduction of warfarin therapy will be reproduced is high if warfarin is stopped[5,6]. The safety of tooth extraction under continuation of antithrombotic drugs has been reported in randomized controlled trials and observational studies[7-13]. According to the multiple observational studies conducted in Japan, tooth extraction could be conducted safely under continuation of warfarin therapy as long as PT-INR was 3.0 or lower[9-12]. Questionnaire surveys on physicians and dentists revealed that the number of physicians and dentists who support tooth extraction under continuation of antithrombotic therapy remains only around 40 to 60% on average, although it is rising (and there are regional differences)[14-16].

It is also necessary to know the techniques for handling the bleeding after tooth extraction. As an emergent measure, astriction with sterilized gauze should be attempted. If the amount of bleeding is large enough to soak the gauze immediately, blood may flow into the pharynx making the patient ingest or vomit, so the patient should be set in a posture avoiding horizontal position or the patient's head should be kept facing sideways to discharge the blood, which should be removed by suction as necessary. If the patient

shows signs of mental agitation, nausea, cerebral anemia-like seizure and so forth, monitoring of the blood pressure, pulse and so forth will be necessary. It is easier to cope with this type of situation by always having sphygmomanometer and percutaneous oxygen saturation measurement device at hand. Local hemostasis procedure should be done after removing the gauze for astriction, observing the condition and degree of bleeding around the socket and checking the bleeding part. The points to be checked as the bleeding part include (1) Bone, (2) Gingiva around the socket, and (3) Sutured part of mucoperiosteal flap. The aspect of bleeding should also be checked, such as arterial hemorrhage, venous hemorrhage, or parenchymatous hemorrhage from capillary blood vessels. In most cases, bleeding can be handled by astriction, adaptation of local hemostasis material and suture. If there is a local etiological factor, it should be removed. Curettage and removal of granulation should be conducted sufficiently, if pathological granulation remains, or if only the tooth is extracted and inflammatory granulation is not curetted sufficiently. Any spiny bone should be removed, and the wound margin on gingiva around the socket should be sutured to close the wound cavity, then hemostatic procedure should be conducted. If periodontal dressing such as COE-PAK can be applied, it will be possible to address hemostasis and wound surface protection, and prevent new secondary hemorrhage. In tooth extraction especially during visiting dental care, it is necessary to determine the environment for emergency measures, and also to transfer the patient to the support hospital instead of trying to handle by oneself if it seems difficult to handle the bleeding after tooth extraction.

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Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ4-6 How do we handle administration of a bisphosphonate-based drug (BPs-based drug) in oral surgery procedures in visiting dental care?

CQ4-6 How do we handle administration of bisphosphonate-based drug (BPs-based drug) in oral surgery procedures in visiting dental care?

Recommendation It is desired that whether it is an injection or oral drug should be confirmed, and that the procedure implemented upon consulting the physician who treats the primary disease regarding the risks and benefits of withdrawal, when conducting an oral surgery procedure on a patient who is on a bisphosphonate-based drug (BPs-based drug) in visiting dental care. In addition, patients of osteoporosis under long-term steroid therapy are also under medication with BPs-based drugs in many cases, and administration of antibacterial drugs before the procedure is recommended in order to prevent the risk of bisphosphonate-related osteonecrosis of the jaw (BRONJ) resulted from the dental surgical procedure.

Explanation

[Background]

In visiting dental care, the number of elderly patients who are on bisphosphonate-based drugs (BPs-based drugs) is increasing. Therefore, it may be necessary to coordinate with the physician who is prescribing the drugs regarding confirmation of the internal drugs and withdrawal. In particular when conducting an invasive treatment such as tooth extraction, risk management on bisphosphonate-related osteonecrosis of the jaw (BRONJ) becomes necessary.

[Explanation]

When the BPs-based drug administration is by injection,

oral surgery should not be implemented in principle if it is used on a frequent administration schedule for cancer treatment, as suggested by the U.S. American Association of Oral and Maxillofacial Surgeons. If an invasive treatment such as tooth extraction is inevitable, it should be implemented after waiting for a 3-month period of withdrawal, regardless of the amount or period of administration. Furthermore, the latest position paper by the Bisphosphonate-related osteonecrosis of the jaw (BRONJ) review board (the Japanese Society for Bone and Mineral Research, Japan Osteoporosis Society, Japanese Society for Oral and Maxillofacial Radiology, the Japanese Society of Periodontology, and Japanese Society of Oral and Maxillofacial Surgeons)[1)] states that withdrawal is not recommended in principle during BPs-based drug administration. However, it is desired that the treatment should be determined upon sufficiently consulting with the physician who treats the primary disease regarding the risks and benefits of withdrawal.

Meanwhile, when the patient is on an oral drug, it is said that an invasive treatment such as tooth extraction can be implemented while continuing the drug unless the patient has had long-term administration of a BPs-based drug for 3 years or longer, which is a BRONJ risk factor, or has other risk factors such as administration of steroid agents and diabetes. However, if the patient has a risk factor or been administered a BPs-based drug for 3 years or longer, the invasive treatment should be conducted after 3 months of withdrawal, progress observed for 1 to 2 months and the clinical healing condition confirmed to resume the BPs-based drug. It is necessary to explain to the patient sufficiently that there is a risk of

BRONJ onset before the oral surgery, and obtain informed consent in writing. In addition, many patients of osteoporosis under long-term steroid therapy are also on bisphosphonate-based drugs in many cases, and administration of antibacterial drugs before the procedure is recommended in order to prevent the risk of bisphosphonate-related osteonecrosis of the jaw (BRONJ) resulted from the dental surgical procedure[2)].

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Strength of evidence

C (weak): The certainty for the estimated value of the effect is limited.

Reliability based on literature

Reliability based on literature
B: There are one or more supporting reports.

CQ4-7 What types of monitoring are useful for providing oral surgery treatment in visiting dental care?

CQ4-7 What types of monitoring are useful for providing oral surgery treatment in visiting dental care?

Recommendation

The subject patients often suffer systemic complications, and it is feared that the mental stress from anxiety or tension for the procedure or the physical invasion of the procedure may cause shock or make the existing systemic disorder worse. It is therefore recommended that the body temperature, pulse, blood pressure and blood oxygen saturation should be monitored when conducting an oral surgery in visiting dental care.

Explanation

[Background]

The patients of oral surgery procedures in visiting dental care often suffer various systemic complications, and it is feared that the mental stress from anxiety or tension for the procedure or the physical invasion of the oral surgery procedure may make the existing systemic disorder worse. The stomatognathic region contains a concentration of important nerves, blood vessels and tissues including the trigeminal and vagus nerves, and it is assumed that the invasive procedure and stress of local anesthesia, tooth extraction and so forth implemented in visiting dental care can easily provoke various biological reflexes. Furthermore, elderly patients with systemic complications who are subject to visiting dental care are increasing. These factors have become entangled and thus increase the number of reports on accidents occurring during dental treatment[1)].

[Explanation]

The patients of visiting dental care often suffer multiple disorders. There are disorders that require special caution in implementing hemostasis or drug administration after an oral surgery procedure, such as high blood pressure, angina pectoris, myocardial infarction, arrhythmia, heart failure, bronchial asthma, chronic bronchitis, diabetes, hyperthyroidism and hypothyroidism, liver dysfunction, renal dysfunction, allergic diseases, and hemorrhagic diathesis. Therefore the dentist should work on examination of the medical history and grasping of the current symptoms, and obtain information on the medication and the conditions of the disease from the physician in charge of the patient in principle. It is necessary to try to mitigate the physical and mental burdens on the patient during the oral surgery procedure, and conduct management with focus on the prevention of worsening or complications of circulatory system diseases in particular. Furthermore, “pain-induced shock” or “dental shock” refer to the state of bad feeling which is also called cerebral anemia-like seizure and vasovagal reflex, and it occurs with the highest frequency of 80% to 90% among the systemic complications observed during dental treatments. It is caused as mental stress (anxiety, tension, and fear) and physical stress (pain) make the sympathetic nerve tense and cause the blood pressure and pulse to rise. While the body tries to reduce the blood pressure and pulse through the parasympathetic nerve to return to the normal conditions, it leads to reduced blood pressure and bradycardia and results in shock if this function becomes excessive. Furthermore, pain stimulation in oral cavity directly stimulates the vagus nerve, which is the parasympathetic nerve in oral cavity region, and causes low blood pressure and bradycardia. It can occur

	immediately after insertion of the local anesthesia injection needle at the earliest, and normally within several minutes. The characteristic symptoms are bradycardia and low blood pressure caused by the tension in the vagus nerve. Other symptoms include pallidness, bad feeling, nausea, and cold sweat. The patient may also lose consciousness, but it is transient, and rarely goes into an irreversible shock. It should be handled by keeping the patient horizontal while elevating both legs (shock position). The patient will recover in about 10 minutes. There is no need to panic as this is not an anaphylactic shock. An anaphylactic shock can be distinguished as it accompanies urticaria or erythema of the skin and edema on the face or mucous membrane. It can be prevented by reduction of the mental stress (anxiety, tension, and fear) through sufficient communication and painless local anesthesia injection. Today, "patients who want to know their own data" are increasing and demands for "safe, secure and high-quality dental care" are higher than ever before, thus more advanced monitoring devices will become essential[2)]. Since there are many patients who also suffer COPD or heart failure in visiting dental care, it is recommended that an oral surgery procedure should be conducted on patients with disorders in the respiratory or circulatory organs while measuring the blood oxygen saturation.
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Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.

Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

●Chapter 5: Oral implants in visiting care

[Chapter 5: Measures for oral implants in visiting care, Table of contents]

Long-term maintenance and stability can be ensured for oral implants (hereinafter referred to as implants) by controlling the occlusion and oral hygiene conditions through maintenance after treatment. Meanwhile, implant troubles at home and nursing facilities have been on the increase as maintenance is stopped as the patients age or suffer physical or mental diseases.

There are characteristics in implants, including the difficulty to repair or remove as they have different drivers for fastening the screws and prosthetic parts depending on the manufacturer, and difficulty to provide oral care as many upper structures of implants have shapes that are difficult to clean. This section therefore explains the questions in implant care during visiting dental care.

CQ5-1: When observing the systemic conditions in implant patients during visiting care, what are the differences from observing an implant patient in a clinic?
CQ5-2: How is it different from the care for an implant patient in a clinic when providing oral care or maintenance to an implant patient during visiting care?
CQ5-3: How is it different from the care for an implant patient in a clinic when conducting medical interview on an implant patient during visiting care?
CQ5-4: How is it different from the care for an implant patient in a clinic when treating a disease in proximity of an implant (swelling, pus discharge, bleeding) in an implant patient during visiting care?
CQ5-5: How is it different from the care for an implant patient in a clinic when treating a failure (mobility, separation) of the implant upper structure in an implant patient during visiting care?
CQ5-6: How is it different from the care for an implant patient in a clinic when removing the implant body from an implant patient during visiting care?

An actual case example on implant treatment which was handled during visiting care at home is also described. Please use it for reference while also checking the corresponding CQ.

CQ5-1 When observing the systemic conditions in implant patients during visiting care, what are the differences from observing an implant patient in a clinic?

CQ5-1	When observing the systemic conditions in implant patients during visiting care, what are the differences from observing an implant patient in a clinic?
Recommendation	Since the systemic diseases of the patients who require visiting dental care may inhibit the management of oral implants, it is necessary to confirm the presence of physical and mental systemic diseases more thoroughly.
Explanation	[Background] Most of the patients who require visiting dental care have systemic diseases. In addition, the most frequent trouble with oral implants is peri-implantitis, which is caused by infection with oral bacteria, and it is important that good oral hygiene conditions are maintained. That is, it is necessary to confirm the systemic diseases that may worsen the oral cavity environment and those that affect the state of mouth cleaning. [Explanation] When conducting a surgical procedure, special caution is required on cardiovascular diseases, diabetes, osteoporosis, malignant tumor and so forth. Systemic disorders such as dementia, Parkinson's disease and rheumatoid arthritis as well as dry mouth are said to affect the maintenance of implants[1]. This section lists the disorders that are often observed in the scenes of visiting dental care and that are related to the maintenance of implants as follows: 1) Dementia The "degree of cooperation" from the patient is an important factor. Since the patient may no longer understand the meaning of oral care and brushing of teeth, it is necessary to confirm the situation of self-care, oral care assistance and so forth. Treatment plan should be developed and explained upon obtaining consent from the family and key persons on intervention by taking into account the reduced ability to make judgments. Information on daily oral care should be shared thoroughly in minute information exchange by obtaining cooperation from the care givers in addition to the patient. Scores of the screening tests such as Revised Hasegawa Dementia Scale (HDS-R) and Mini-Mental State Examination (MMSE)[2, 3] and FAST (functional assessment staging for Alzheimer dementia) can be used as reference in grasping the degree of dementia progress.

2) Parkinson's disease

The patients have difficulty in doing self-care due to tremor and muscle contracture symptoms, ending up with poor oral hygiene conditions. It has been reported that they are also lower in implant survival rate than healthy group[4]. Furthermore, movement disorders caused by dyskinesia and dystonia may make it difficult to do oral care. For patients of Parkinson's disease, severity in Hoehn and Yahr scale and the drugs that are prescribed should be confirmed, as the period of drug efficacy may be reduced and symptoms may appear more strongly due to the loss of effect if the patient has been on a dopaminergic drug such as levodopa and dopamine agonists for a long period.

3) Chronic rheumatoid arthritis and cerebrovascular disorder sequela

It becomes difficult to hold the toothbrush if a patient has an onset of rheumatoid arthritis in the fingers or has paralysis due to cerebrovascular disorder sequela. It is necessary to suggest the oral care goods appropriate for the patient such as a toothbrush with a thick handle, and provide instructions on how to use them. For parts where self-care is difficult or tools that cannot be used by the patient, assistance of a dentist, dental hygienist and care giver should be added. In addition, if a patient suffers motor paralysis or sensory disturbance in the oral cavity or pharynx as cerebrovascular disorder sequela, such disorder will deteriorate the self-cleaning functions of the oral cavity and worsen the oral hygiene conditions.

4) Xerostomia (dry mouth)

It is related to not only caries and periodontal diseases but also implant maintenance. Xerostomia is affected by oral respiration, systemic diseases such as Sjogren's syndrome[5, 6], Parkinson's disease, SLE, and diabetes, as well as various drugs including anticholinergic drugs, antihistamine drugs, diuretic drugs and psychotropic drugs. Caution is required on dry mouth caused by polypharmacy[7]. The oral cavity should be kept clean by rinsing the mouth with mild mouthwash and kept moist with the use of a moisturizing agent. If excessive dry mouth occurs, consultation with the physician in charge of the patient on the medication and use of dry mouth improvement drug should also be considered.

Since the conditions of self-care by the patient is important in maintenance of implants in patients of visiting dental care,

the judgment criteria on the degree of self-reliance in mouth cleaning (BDR index, Table 1)[8] for the patient should be grasped. It is also important to check the environment that surrounds the patient (degree of cooperation from the patient's family and care givers in oral care, etc.).

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Strength of evidence

C (weak): The certainty for the estimated value of the effect is limited.

Reliability based on literature

Reliability based on literature

B: There are one or more supporting reports.

Table 1: Judgment criteria on the degree of self-reliance in mouth cleaning (BDR index)

Item	Self-reliance	Partial assistance	Full assistance	Difficulty in assistance	
Brushing	a Almost always brushes by oneself.	b Partially brushes by oneself. (although unstable)	c Cannot brush by oneself.		
	1. Moves then brushes. 2. Brushes in the bed.	1. Maintains the sitting position. 2. Cannot maintain the sitting position.	1. Takes the sitting or half-sitting position. 2. Cannot take even the half-sitting position.	Yes	No
Denture wearing	a Puts on/removes the denture by oneself.	b Either removes or puts the denture on.	c Does not put on or remove the denture by oneself at all.	Yes	No
Mouth Rinsing	a Gurgles.	b Capable of holding the water in mouth.	c Cannot hold the water in mouth.	Yes	No

CQ5-2 How is it different from the care for an implant patient in a clinic when providing oral care or maintenance to an implant patient during visiting care?

CQ5-2	How is it different from the care for an implant patient in a clinic when providing oral care or maintenance to an implant patient during visiting care?
Recommendation	While it is desired that implant maintenance equivalent to one in a dentist clinic should be provided, consideration should also be made to establish an oral cavity environment which is easier for self-care by the patient or oral care by the care giver.
Explanation	[Background] Many of the patients who require visiting dental care have difficulty in doing self-care. The most frequent requests from the patient or the patient's family when a patient who wears an implant is admitted to a hospital or becomes bedridden is "how to clean and manage" the implant[1]. That is, instruction to the care givers on oral care is required in addition to the specialized oral care. [Explanation] It is desired that implant maintenance equivalent to one in a dentist clinic should be provided in visiting dental care. That is, dental plaque and calculus adhering to the implant body should be removed by using plastic manual scaler, titanium manual scaler, or an ultrasonic scaler with a Teflon tip. The prosthetic device should be polished using a rubber cup or rubber tip[2]. However, it is necessary to determine the frequency of oral hygiene management by a dental hygienist with sufficient consideration of the conditions of the oral cavity, systemic conditions, the degree of cooperation in oral care from the family and facility employees and so forth, as many patients of visiting dental care have difficulty in doing self-care in practice. Use of a special toothbrush for implants should also be considered depending on the shape of prosthetic device, number of implants embedded, and the conditions of the patient. In addition, instruction to the care givers on oral care is necessary since the oral care procedures for implants have not been sufficiently popularized among the employees of nursing care facilities such as nurses who would be providing the oral care[3]. For patients of dementia or Parkinson's disease, change to a design which prioritizes cleaning properties rather than the appearance[5] should be examined with sufficient consideration of the self-reliance of the patient in mouth cleaning, the environment surrounding the patient, wishes of the patient and the family and so forth, since it is easier to do

oral care if the prosthetic device is removable[4], or transition to sleeping or implant overdenture (IOD) should be considered if implant management seems to be difficult (Fig. 1)[6] (CQ5-6).

It is necessary to share the knowledge on implants and deepen the understanding among the specialists in dentistry, nursing care givers, and the family of the patient with implants.

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Strength of evidence: D (very weak): The certainty for the estimated value of the effect is very low.

Reliability based on literature: Reliability based on literature
C: There are no supporting reports.

(1) Upper structure -> upper structure removal -> healing -> preparation of denture

Sleeping: (2) Upper structure -> upper structure removal -> implant goes under the mucous membrane

Figs. 1 to 7: Transition to IOD

(Sleeping: To attach the sealing screw instead of the upper structure and prevent the implant body from functioning for some reason)[7)]

CQ5-3 How is it different from the care for an implant patient in a clinic when conducting medical interview on an implant patient during visiting care?

CQ5-3	How is it different from the care for an implant patient in a clinic when conducting medical interview on an implant patient during visiting care?
Recommendation	Since the prosthetic parts and drivers for implants vary depending on the manufacturer, one should try to obtain the information on the type of implant that is embedded. There are cases of care which they have to handle while being unable to obtain enough information on the implant.
Explanation	[Background] It is most important in conducting treatment smoothly that the information on the implant that is embedded is obtained. On the other hand, visiting care rarely requires new implant parts for re-manufacture of implant upper structure and so forth, and involves matters that one must handle even without the implant information obtained, such as correction when a screw in the upper structure is loose or an upper structure came off, and maintenance. [Explanation] The following occur in medical interview for implant care at a clinic: ・ Recommending care at the original dental clinic where implant was embedded. ・ Starting care after obtaining a referral and care information from the original dental clinic where implant was embedded. Compared to the above, the following occur in visiting dental care: ・ Checking the dental clinic the patient had previously received care from with the family or care giver, since the information on the implant embedded cannot be obtained in many cases due to dementia of the patient, the dental clinic which embedded the implant closing and so forth. ・ Confirming whether it is acceptable to implement implant sleeping, upper structure shape correction, or implant removal depending on the situation due to reasons such as implant cleaning or mending difficulty. The details of measures that can be taken depending on whether the implant type and manufacturer are determined or not are listed below:

<Processes that cannot be implemented unless the manufacturer is known>

- Re-manufacture of the upper structure (information on implant type and diameter is necessary when selecting the abutment to be used for impression coping or upper structure manufacture)
- Attachment and removal of screws for angulation tolerated abutment

<Processes that can be implemented even when the manufacturer is unknown>

- Removal of the upper structure (cutting with a bar)
- Screw tightening (abutment screw driver kit by Wada Precision Dental Laboratories, see CQ5-5)
- Implant removal (see CQ5-6)
- Re-installation or re-manufacture of cement-fixed upper structure
- Maintenance and treatment of peri-implantitis

<Method for obtaining the implant manufacturer and information>

① Confirmation with the dental clinic which embedded the implant

- Request for information from the dental clinic which embedded the implant
- Request for cooperation from the dental clinic which embedded the implant in visiting care if possible

<Necessary implant information>

Manufacturer, type, diameter, length, screw retention, cement retention (temporary cementation or cementation), type of abutment (prepable abutment, angulated abutment, etc.), and presence of angulation tolerated abutment

② How to identify the manufacturer when the dentist who embedded the implant is unknown

- Take X-ray radiographs and check the type of implant by looking up "What is this implant?[1,2]."
- Contact the manufacturers and have them check the radiographs if there are several candidates for the manufacturer and cannot be determined.

③ If it is difficult to handle by oneself, request an implant specialist who can handle visiting care using "Visiting care implant map" (http://www.swallowing.link/implant).

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Strength of evidence	D (very weak): The certainty for the estimated value of the effect is very low.
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ5-4 How is it different from the care for an implant patient in a clinic when treating a disease in proximity of an implant (swelling, pus discharge, bleeding) in an implant patient during visiting care?

CQ5-4	How is it different from the care for an implant patient in a clinic when treating a disease in proximity of an implant (swelling, pus discharge, bleeding) in an implant patient during visiting care?
Recommendation	The status of plaque control including self-care and oral care by the care giver should be confirmed and mouth cleaning thoroughly ensured. It is also necessary to increase the frequency of oral care depending on the degree of inflammation and avoid procedures that would cause serious burdens to attempt resolution of the inflammation.
Explanation	[Background] In a study by the Japanese Society of Oral Implantology[1], it was found that 3% of the patients who received visiting dental care had received implant treatment in the past, and that more than half of these patients were unable to do self-care. The most frequent troubles regarding implants were difficulty in cleaning (47%) and peri-implantitis (39%). [Explanation] In a dental clinic, nonsurgical treatment on peri-implantitis is started after X-ray inspection such as CT imaging, and surgical treatment on peri-implantitis that involves incision or ablation is implemented if it is not seen to improve. In visiting care, there are restrictions in CT imaging, treatments that take long periods, and highly invasive surgical procedures. Since it is difficult to implement surgical procedures on peri-implantitis that involve incision or ablation during implant treatments in visiting care, anti-inflammatory treatments with the following nonsurgical measures, or implant removal should be selected depending on the situation: 1. Peri-implantitis or peri-implant mucositis that involves only bleeding ・ Implant maintenance should be implemented according to CQ5-2. ・ Correction of the upper structure shape if cleaning is difficult (see Figs. 1 to 7) ・ Cleaning of pockets around the implant 2. Peri-implantitis that involves swelling ・ TBI and mechanical cleaning in a similar fashion to 1 above ・ Systemic or local administration of antibacterial drugs

(tetracycline fibers)

- Nonsurgical implementation of debridement (using plastic or titanium curet or ultrasonic device) around the implant with the purpose of removing the dental calculus, residual cement and biofilm on the contaminated implant surface.

3. Peri-implantitis whose symptoms do not resolve even after 2 above

Removal of the upper structure to observe progress

4. Peri-implantitis whose symptoms do not resolve even after 3 above

Removal of the implant body should be examined (see CQ5-6).

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Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

Photo 1: State in which cleaning is difficult due to the shape of the implant upper structure for maxillary anterior teeth implant



Photos 2 to 4: Oral cavity after removing the implant upper structure and the

removed upper structure

Photos 5 to 7: Correction of the implant upper structure to a shape that can be cleaned, and the pockets around the implant were cleaned

Figs. 1 to 7: An example of upper structure shape correction

CQ5-5 How is it different from the care for an implant patient in a clinic when treating a failure (mobility, separation) of the implant upper structure in an implant patient during visiting care?

CQ5-5	How is it different from the care for an implant patient in a clinic when treating a failure (mobility, separation) of the implant upper structure in an implant patient during visiting care?
Recommendation	Since there are many cases in which implant information is not available for troubles with implant upper structures during visiting care, it should be handled by correction of the upper structure which was already attached or by sleeping instead of considering manufacturing a new upper structure.
Explanation	[Background] Troubles involving implant upper structure occur as occlusion changes due to occlusal wear of the remaining natural teeth or changes in the prosthetic materials after implant treatment and thus a large occlusal force or lateral force is applied to the implant upper structure. [Explanation] When implants are handled at a dental clinic (when treatment is given at a different institution), implant information is collected to identify the manufacturer and type and the possibility of re-mending is examined. Compared to this, there are many cases in which self-care or identification of implant manufacturer and type is difficult in visiting care, and therefore adjustment, re-attachment or sleeping of the existing prosthetic materials should be examined with caution on preventing ingestion or aspiration instead of examining re-mending in principle. 1) Handling of screw loosening (Fig. 1) ・ Clockwise turning when tightening the screw and counterclockwise turning when loosening ・ Although manufacturer's recommended value should be used for screw re-tightening, it should be kept around 15 Ncm if the manufacturer is unknown.

- Occlusion should be confirmed and adjusted after re-tightening the screw.

(1) When the implant upper structure is screw-retained
1. When it is a direct structure (Fig. 1 Left, one screw)
Remove the material that seals the access hole. If it is sealed with a composite resin and so forth, remove it by using a round bar on the engine while being careful not to damage the screw inside. Then tighten the screw with the implant driver (in the abutment screw driver kit).

2. When the implant has an indirect structure (Fig. 1 Center, 2 screws)
When multiple implants are embedded and they are screw type, angulation tolerated abutments (abutments) are often contained. The angulation tolerated abutment can be accessed by removing the screws for implant upper structure fixing. Angulation tolerated abutments often require a special driver of the manufacturer, and thus identification of the manufacturer is necessary in many cases.

(2) When the implant upper structure is cementation type
The implants that come with a porcelain fused cast crown or removable knob often have temporary cementation (Fig. 1 Right), and removal of the upper structure should be attempted first by using a remover. The implant often has cementation if it is all-ceramic.
Make a hole from the occlusion surface with caution on the direction of embedding in a similar fashion to pulp extirpation, and access the abutment screw. If it is a rare case in which a prepable abutment (Fig. 2) is used, caution is required as there is no abutment screw and a special driver is required.

- If the type of implant is unknown, the drivers in the abutment screw driver kit (Fig. 3) should be tried as the implant driver in order.

(3) Removal of the upper structure
(1) The screw should be accessed as described above for sleeping or implant removal, and the upper structure and abutment removed by loosening the screw.
(2) If it is acceptable to remove and destroy the upper structure, it is possible to remove it in principle by forming a groove in a buccolingual manner using a bar just like a natural tooth. However, prosthetic margins are often established deep under the gingival margin. If it is desired that the upper structure is removed as the screw is loosened, it is possible to grind the contact and remove it by turning the entire upper

	structure with forceps and so forth. (3) Broken facing of upper structure should be handled by grinding. (4) Sleeping (or IOD) should be examined if it is difficult to handle due to a problem in implant upper structure. A case example where the implant was made into an IOD is presented. (5) The upper structure of a 1-piece implant can be manufactured by taking the impression in a similar fashion to natural teeth. Removal of a 1-piece implant should be done by using a trephine bar. Since it is difficult to remove in visiting care, it should be ground with a diamond bar and so forth so as not to damage the lips and so forth if it is not necessary. (6) If the material filling of the access hole falls out, check that there is no screw loosening and seal it again after removing the food residue and so forth in the access hole and cleaning the inside.
References	1) Ikumi N. Issues and prospects for implant treatment in super aging society: Journal of Japanese society of oral implantology 30: 79-85. 2017. (in Japanese) 2) Akagawa Y. et al. Fundamental Concepts and Techniques of Oral Implants. Ishiyaku Publishers,Inc.
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

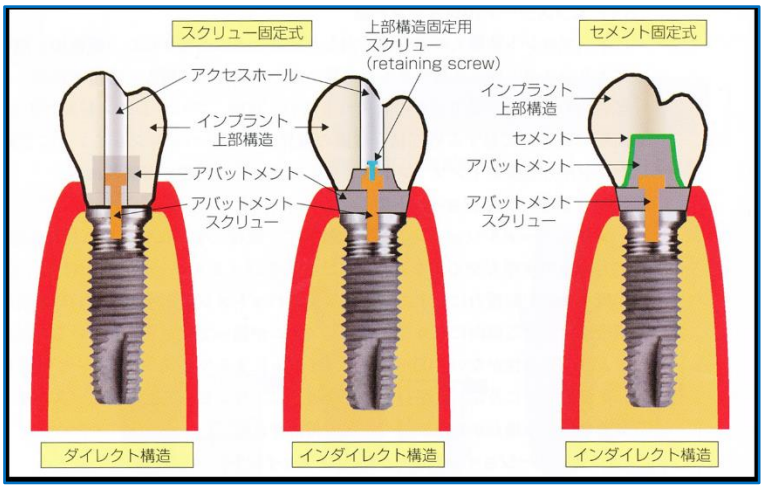

Fig. 1: How to access and handle screws (in japanese)

Fig. 2: Prepable abutment (Straumann)

(It is first installed in the oral cavity then formed like an abutment tooth within the oral cavity.)

Fig. 3: Abutment screw driver kit

CQ5-6 How is it different from the care for an implant patient in a clinic when removing the implant body from an implant patient during visiting care?

CQ5-6	How is it different from the care for an implant patient in a clinic when removing the implant body from an implant patient during visiting care?
Recommendation	The difficulty in removing the implant body varies greatly depending on whether the implant upper structure can be removed or not. In principle, removal of the implant body in which incision or ablation of mucous membrane or bone grinding is expected should not be implemented in visiting care, but removal should be implemented for those that can be removed easily with the use of an elevator or forceps due to bone resorption and those that can be removed by using an implant removal kit. In addition, sleeping of the implant body should be reconsidered while taking into consideration the systemic conditions of the patient and the conditions of the prosthetic device.
Explanation	[Background] A characteristic of implants is that they do not have periodontal membranes and that they do not generate mobility even when bone resorption has advanced due to inflammation. While it may be possible to remove by using an elevator or forceps in a similar fashion to natural teeth if bone resorption is considerable, removal may often be difficult depending on the amount of bone remaining around the implant (which depends on the length of the implant body). If the implant upper structure can be removed, the implant removal kit can often be used to remove the implant body. [Explanation] **1) In implant care at a dental clinic** After taking panorama, dental and CT images, decision on whether to implement treatments such as surgical procedure on peri-implantitis or remove the implant body should be made. If the decision is to remove, the implant body should be removed by one of the following methods:

① Removal with an elevator or forceps,
② Use of an implant removal kit, and
③ (If a removal kit cannot be used), removal by grinding the bone around the implant using a trephine bar and so forth after incision and ablation.

2) In visiting dental care

- Panorama or CT imaging cannot be conducted.
- Since surgical procedures that involve incision or ablation cannot be conducted in principle due to reasons in systemic conditions and facility, sleeping should be considered first before removal of the implant in visiting dental care.

3) Examples of indications for sleeping (or IOD)

・Cleaning of the implant upper structure is difficult.
・The implant upper structure is not functioning in oral cavity.
・The implant upper structure is damaging the mucous membrane of the oral cavity.
・When upper structure is not or cannot be re-manufactured even though there is a trouble in implant upper structure (unknown manufacturer, screw breaking, etc.)

The implant should be removed if it is determined that the case is not an indication for sleeping.

4) Examples of indications for implant removal

・Implant mobility, pain that cannot be eliminated, and strong pus discharge
・The amount of bone remaining around the implant is 4 mm or smaller.
・Bone resorption around the implant is 2/3 or more.
・Cleaning of the implant is difficult (sleeping should be considered first).
・The implant is damaging the opposite mucous membrane and so forth (sleeping should be considered first).

5) How to remove the implant

① Removal using an elevator or forceps (by turning in

counterclockwise direction) in a similar fashion to a natural tooth (it is easier to remove from the maxilla if the remaining amount of bone is extremely small)

② If removal with an elevator and so forth is impossible, the policy should be to remove the implant upper structure and use an implant removal kit.

③ For the method to remove the upper structure, refer to the section on screw loosening in CQ5-5.

④ If the implant upper structure is removed successfully, an implant removal kit (fixture remover kit, Fig. 1) shall be used. Since there are 6 types of inner screws in total in an implant removal kit, it is possible to remove the implant by trying the inner screws in order even if the implant type is unknown, as long as the implant upper structure can be removed.

⑤ When removal kit cannot be used
Since it is difficult to remove in visiting care, "Visiting care implant map" (http://www.swallowing.link/implant), should be used to refer to a dental clinic or university hospital capable of implant removal.

6) Cases in which removal kits cannot be used
・All 1-piece types, AQB, μOne (2-piece type can be removed)
・Breaks in implant body
・Remaining of a broken abutment screw
・All types by Bicon Japan
・Straumann bone level 3.3 mm diameter
・CAMLOG 3.3 mm diameter
・IMX 3.3 mm diameter
・All POI 3-piece types
(φ3.3 mm is mainly used for incisors and lateral incisors)

References	1） Okubo C. et al. Journal of Japanese Society of Oral Implantology. vol.31 No.4, 2018.12. 3-21.
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

Fig. 1: Fixture remover kit

[Case]

A case handled in visiting dental care at home, in which the oral cavity implant upper structure was removed and changed to a full denture is introduced below:
Patient: 84-year-old female
Name of disease: Root fracture in maxillary left cuspid tooth
Chief complaint: Bridge mobility, pain during mastication while using denture
Problems: The implant and natural tooth were connected by the mobile bridge, and a removable partial denture was installed using it as the abutment tooth. The patient suffered dementia and the dental clinic where the implant treatment was conducted and the implant manufacturer were unknown.
Measures: Extraction of maxillary left cuspid tooth, removal of the implant upper structure, and manufacture of a removable complete denture (Table 1)

Table 1

Progress	Measure and policy	Applicable CQ
At initial diagnosis [Problem] Difficulty in self-care due to dementia  Fig. 1: Bridge using the implant body and a natural tooth as the bridge abutment	• Oral hygiene instruction to the care giver as self-care was difficult • Regular professional care by visiting dental care	Implant maintenance -> See CQ5-2.
At re-examination [Problem] Bridge mobility, pain during mastication while using denture	• Since the dental clinic which embedded the implant and the manufacturer were unknown, it was explained to the family	Information collection on implant -> CQ5-1, CQ5-3

Figs. 2 and 3: When the upper structure was removed and the tooth root was checked, root fracture had occurred in the maxillary left cuspid tooth and the abutment screw in the maxillary left first molar tooth had been broken.

that it was difficult to re-mend it and that sleeping, removal and so forth would be necessary depending on the situation.

- Removal of the upper structure: Since it used cementation, a hole was made from the occlusal surface of the implant upper structure with caution on the direction of implant embedding to reach the access hole.

Since the manufacturer was unknown, the abutment screw of the implant at the location corresponding to No. 6 that was loosened was removed by trying the abutment screw driver kit in order. The abutment screw for the implant corresponding to No. 5 in front of it had broken.

- Extraction of the maxillary left cuspid tooth
- Grinding on the sharp edge of the abutment in the maxillary left first molar tooth
- Since the removal of the implant body and

Removal of upper structure
-> CQ5-5

Removal of implant body
-> CQ5-6

	abutment was difficult, a complete denture was manufactured over the abutment.	
At re-examination  Fig. 4: Photograph of the oral cavity after extraction of the maxillary left cuspid tooth	Sleeping of the implant body was implemented to manufacture a removable complete denture according to the usual method.	Sleeping of the implant body -> CQ5-2
  Figs. 5 and 6: Complete denture that was manufactured		
At re-examination [Problems] Bite wound by the abutment when denture was	・Since it was difficult to remove the abutment with broken screw in the front, the plan is to request for	Utilization of Visiting care implant map -> CQ5- 6

removed, and broken denture in abutment part	cooperation from a dental clinic which is capable of handling it referring to the Visiting care implant map in the future.

●Chapter 6: Terminal care

[Chapter 6: Significance of terminal care, Table of contents]

The systemic conditions, the level of awareness and the period of terminal stage vary by the type of disease. Whatever the cause of reaching the terminal stage is, many people spend the terminal stage at hospitals or facilities at present, and few people at home. However, the national policy is to increase the number of cases where patients can spend their deathbeds at home, and it is socially considered better to spend their last days at home in a familiar environment. It is assumed that the number of dentists who will be involved in terminal care as a part of visiting dental care will increase.

Dentists have rarely gotten involved in people's deaths, except for some fields including oral surgery, in the past. However, the opportunity for dentists to become involved with patients considering life prognosis and human deaths is expected to grow in the future as the degree of aging in society advances. It is necessary to determine the treatment policy that is considered feasible and practical upon comprehensively judging the approximate life prognosis, systemic conditions and so forth while respecting the improvement in Quality of Life (QOL), which is considered more important in terminal care, rather than the treatment considered best in the science of dentistry or the oral cavity conditions. Both knowledge and experience will be necessary in making this decision, and the total ability of the dentist as a medical care provider will be tested.

The oral cavity conditions of terminal patients are not favorable. For this reason, there are many things a dentist can contribute to during terminal care, and both physicians and dentists need to promote further mutual understanding. We hope that this CQ will help as reference in doing so.

CQ6-1 What are the characteristics of terminal stage?

CQ6-1	What are the characteristics of terminal stage?
Recommendation	The definition of terminal stage is not clear, and the range varies depending on the disorder.
Explanation	[Background] The processes of death can be roughly classified into 4 types, which are accidents causing sudden death, cancer and so forth, organ failure including heart and lung diseases, and frailty and dementia and so forth[1]. Of these, cancer, organ failure including heart and lung diseases, and frailty and dementia and so forth have what is called the terminal stage. It is said that the stage varies in the period and progress among all of these types. As the cause of death, it is reported that cancer corresponds to 22%, organ failure 16%, and frailty and dementia and so forth 47%[1]. [Explanation] A figure on the processes of death is shown. During the terminal stage for cancer, the physical functions are maintained until immediately before death, then they deteriorate rapidly at the end to reach death (**Fig. 1 Top right**). During the terminal stage of organ failure such as heart and lung diseases, the patient gradually gets worse repeating deterioration and recovery in physical functions, then reach death after a long period in some cases (**Fig. 1 Bottom left**). During the terminal stage of frailty and dementia and so forth, death occurs after the state in which the functions have deteriorated continues for a while and thus the period is also prolonged. Nervous diseases such as amyotrophic lateral sclerosis and Parkinson's disease are also included in this group (**Fig. 1 Bottom right**). In addition, the state of consciousness varies dramatically by the disease, and it is often difficult to communicate during the terminal stage of frailty, dementia and so forth, even though communication may be possible up until immediately

	before death during the terminal stage for cancer and organ failure. It is necessary to properly select the method of handling with caution on the life prognosis, length of the terminal stage and so forth while keeping in mind the above classification when handling patients in terminal stage as a dentist.
References	1) Lunney JR, Lynn J, Hogan C. Profiles of older medicare decedents. J Am Geriatr Soc. 2002; 50(6): 1108-12.
Strength of evidence	No evidence (not information that requires an intervention study)
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

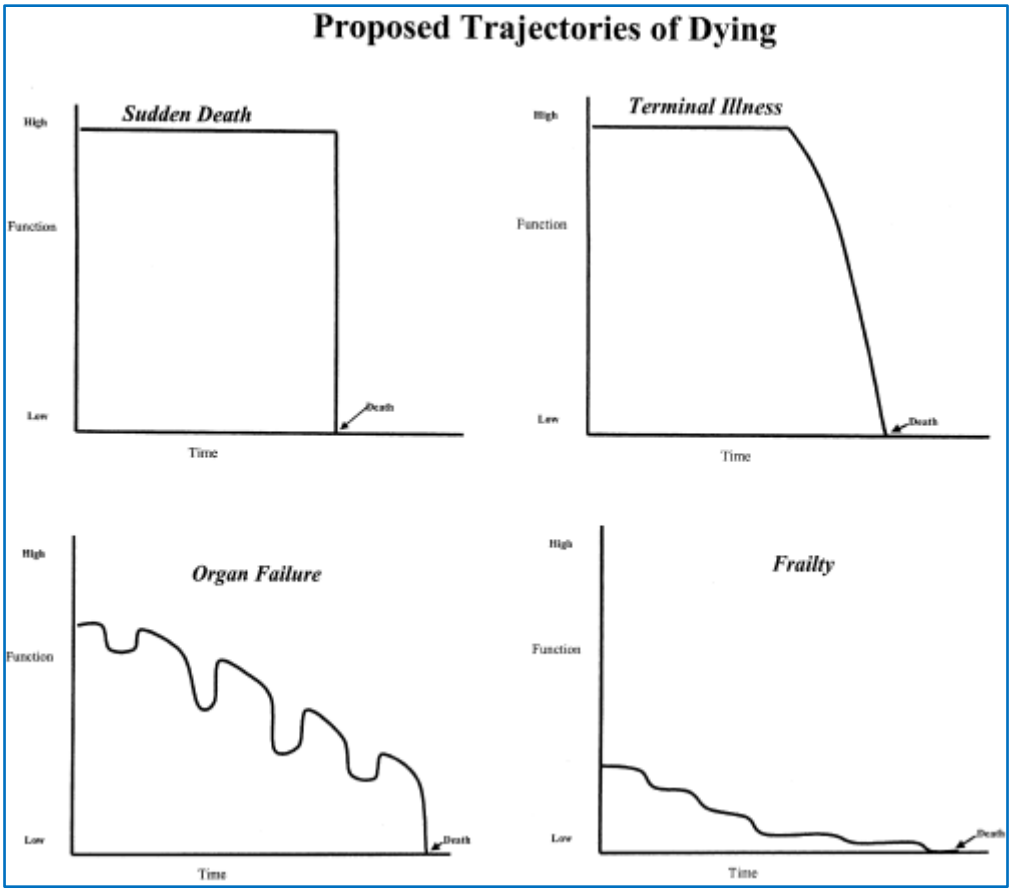

Fig. 1 Processes of death

CQ6-2 Can the life prognosis during terminal stage be estimated?

CQ6-2	Can the life prognosis during terminal stage be estimated?
Recommendation	While the terminal stage of cancer can be predicted to some extent, those of other death processes have not been established.
Explanation	[Background] As the terminal stage of cancer, Palliative Prognostic Score: PaP score[1], Palliative Prognostic Index: PPI[2], Prognosis in Palliative care study predictor models: PiPs models[3,4] and so forth have been established. However, the fact is that it is difficult to predict the prognosis for non-cancer types, as the period of the terminal stage may be long in many cases at present. [Explanation] Prediction of prognosis is relatively high in reliability for the terminal stage of cancer and so forth, which is short in period with narrow ranges of prognosis prediction. While there is a report that says PaP and PiPs deliver good results in terms of prognosis prediction accuracy[5], the easiest to use among the 3 above is PPI. **Fig. 1** shows an outline of PPI. PPI is an indicator which divides the patients into groups with cutoff value 6, and which specifies that the life prognosis is 21 days or fewer when PPI ≥ 6.5. It is reported to have sensitivity 51 to 85 and specificity 67 to 94[2,6,7]. It can be said that it is difficult to make a simple prognosis prediction with PaP as it requires the results of blood test. While PiPs can predict without blood test results, it needs inputting on the website, and leaves some problem regarding convenience. It is necessary to consider the life prognosis when getting involved with a patient of terminal cancer as a dentist. Since the oral cavity environment worsens as the patient approaches death during the terminal stage of cancer as described later, it is necessary to develop the dental treatment and oral care plan with the prognosis prediction in

mind. It seems a good method to make judgments with PPI in doing so.

References

1） Pirovano M, Maltoni M, Nanni O, et al. A new palliative prognostic score: a first step for the staging of terminally ill cancer patients. Italian Multicenter and Study Group on Palliative Care. J Pain Symptom Manage. 1999 Apr;17(4):231-9.

2） Morita T, Tsunoda J, Inoue S, et al. The Palliative Prognostic Index: a scoring system for survival prediction of terminally ill cancer patients. Support Care Cancer. 1999 May;7(3):128-33.

3） Gwilliam B, Keeley V, Todd C, et al. Development of prognosis in palliative care study (PiPS) predictor models to improve prognostication in advanced cancer: prospective cohort study. BMJ. 2011 Aug 25;343

4） Baba M, Maeda I, Morita T, et al. Independent validation of the modified prognosis palliative care study predictor models in three palliative care settings. J Pain Symptom Manage. 2015 May;49(5):853-60.

5） Baba M, Maeda I, Morita T, et al. Survival prediction for advanced cancer patients in the real world: A comparison of the Palliative Prognostic Score, Delirium-Palliative Prognostic Score, Palliative Prognostic Index and modified Prognosis in Palliative Care Study predictor model. Eur J Cancer. 2015 Aug;51(12):1618-29.

6） Stone PC, Lund S. Predicting prognosis in patients with advanced cancer. Ann Oncol. 2007 Jun;18(6):971-6.

7） Maltoni M, Scarpi E, Pittureri C, et al. Prospective comparison of prognostic scores in palliative care cancer populations. Oncologist. 2012;17(3):446-54.

Strength of evidence

A (strong): There is strong certainty for the estimated value of the effect.

Reliability based on literature

Reliability based on literature

A: There are multiple supporting reports and they mostly coincide. There are highly reliable reports.

Palliative Prognostic Index (PPI) evaluation criteria (in japanese)

・PPS　　10　20　30　40　50　60　70　80　90　100

%	起居	活動と症状	ADL	経口摂取	意識レベル
100	100%起居している	正常の活動が可能 症状なし	自立	正常	清明
90		正常の活動が可能 いくらかの症状がある			
80		いくらかの症状はあるが、努力すれば正常の活動が可能		正常 または 減少	
70	ほとんど起居している	何らかの症状があり通常の仕事や業務が困難			
60		明らかな症状があり趣味や家事を行うことが困難	時に介助		清明 または 混乱
50	ほとんど座位か横たわっている	著明な症状がありどんな仕事もすることが困難	しばしば介助		
40	ほとんど臥床		ほとんど介助		清明 または 混乱 または傾眠
30	常に臥床		全介助	減少	
20				数口以下	
10				口腔ケアのみ	傾眠 または 昏睡

How to calculate PPS

Items are aligned from left (daily life) to right in order of higher priority. The closest level to the patient is determined by reading from the left (while comprehensive judgment should be made, the left side should be prioritized).

E.g.) Daily life 50, activity and symptoms 60, ADL 50, oral intake 100, awareness level 100 => PPS50

E.g.) Daily life 30, activity and symptoms 40, ADL 40, oral intake 100, awareness level 100 => PPS30

E.g.) Daily life 30, activity and symptoms 60, ADL 60, oral intake 100, awareness level 100 => PPS50

・Amount of oral intake　　1: Normal, 2: Reduced, 3: Several bites or less (1 selected for high-calorie infusion and tube feeding)

・Edema　　1: None, 2: Present

・Dyspnea at rest　1: None, 2: Present

・State of communication

1: Capable of voluntary and complex communication with clear meaning

2: Capable of voluntary communication with clear meaning if the content is simple

3: Capable of voluntary expressions but incoherent

Or the patient does not speak voluntarily but is capable of language expressions making sense if prompted.

Or not capable of language expression making sense even if prompted.

Evaluation on each of PPS, oral intake, edema, dyspnea at rest, and communication is made into a score by the following table (in japanese):

項目	評価	スコア
PPS	10-20	4.0
	30-50	2.5
	≧60	0
経口摂取	数口以下	2.5
	減少	1.0
	正常	0
浮腫	あり	1.0
安静時呼吸困難	あり	3.5
コミュニケーション	3	4.0

It is determined that the predicted prognosis is highly likely to be 21 days or fewer (in units of weeks) when the score is summed to be 6.5 points or higher.

Fig. 1 Outline of PPI

CQ6-3 What problems of the oral cavity tend to occur during the terminal stage?

CQ6-3	What problems of the oral cavity tend to occur during the terminal stage?
Recommendation	Mouth dryness occurs at a high frequency along with many other oral complications.
Explanation	[Background] There is a report in which they observed a significantly larger number of mouth dryness, glossitis, and blood points on mucous membrane in oral cavity at the end of the terminal stage of cancer when the life prognosis was less than 28 days compared to the group with a life prognosis longer than that[1]. In addition, another report that studied the transitions in oral cavity complications during the terminal stage of cancer before death said that the rate of having poor mouth cleaning conditions increased and the number of dry mouth symptoms grew, making it more necessary to receive oral care by dentists as the time of death approached[2]. The changes in oral cavity environment are unknown for frailty and dementia and so forth; one of the reasons is that the definition of the period of terminal stage is not clear for these types. However, it is well-known in the clinical field that mouth dryness becomes more evident and that formation of membranous substances and adherence of expectoration to the oral mucosa are often seen when the time of death approaches. [Explanation] It is known that the oral cavity environment of terminal cancer patients tends to deteriorate. Due to the deterioration in the systemic conditions generated by various causes such as anemia, undernutrition, and cancerous cachexia as well as the effects of treatments including opioid and steroid administration, symptoms such as mouth dryness, mouth ulcer, incompatible denture, and oral candidiasis may appear. Furthermore, it becomes difficult for the patient to keep good oral cavity conditions by oneself when the time of death

	approaches, and the conditions become even worse without oral care. Meanwhile, it is known that mouth dryness tends to occur also during the non-cancer terminal stages such as frailty and dementia. Causes of this include the decrease in saliva secretion as movements of the oral cavity decrease and stimulation stops with deteriorated eating and swallowing functions, reduced awareness level, reduced amount of oral intake and speech; a constantly open mouth; and mouth breathing. In addition, it becomes difficult to keep good oral hygiene conditions by oneself, and the conditions worsen without oral care; this applies also to the terminal stage of cancer. Implementation of oral care is therefore important.
References	1） Matsuo K, Watanabe R, Kanamori D, et al.: Associations between oral complications and days to death in palliative care patients. Support Care Cancer 2016 Jan;24(1):157-161. 2） Iwazaki S, Ohno T, Morita T, et al. Oral Complications of Terminally Ill Cancer Patients : an Observational Study. Palliative Care. 22: 369-373, 2012.
Strength of evidence	No evidence (not information that requires an intervention study)
Reliability based on literature	Reliability based on literature A: There are multiple supporting reports and they mostly coincide. There are highly reliable reports.

CQ6-4 What points should be noted in dental treatment during terminal stage?

CQ6-4	What points should be noted in dental treatment during terminal stage?
Recommendation	What needs to be considered most important is maintenance and improvement of the Quality of Life (QOL).
Explanation	[Background] What needs to be considered most important in medicine during the terminal stage, when there is no hope for cure or improvement of the disease, is the QOL. The definition of palliative care specified by World Health Organization (WHO) in 2002 is the following: "Palliative care is an approach that improves the quality of life of patients and their families who are facing problems associated with life-threatening illness. It prevents and relieves suffering through the early identification, correct assessment and treatment of pain and other problems, whether physical, psychosocial or spiritual." Dental treatments during the terminal stage should be approached in a similar fashion to the above definition of palliative care. [Explanation] In dental care, it is necessary to handle with awareness that treatment is an approach to improve the QOL as defined by WHO. For patients of cancer and so forth who are capable of communication, the intentions of the patient should be confirmed sufficiently. If the patient is in terminal stage of a non-cancer disease, the intentions should of course be confirmed with the patient if possible, but it is often difficult to communicate. In that case, treatments should be given upon confirming the intentions of the family. It does not mean that invasive dental procedures are forbidden. It means that it is necessary to always prioritize the QOL and consider conducting invasive dental procedures while respecting the intentions of the patient if they will lead to the maintenance or improvement of the QOL as a consequence. Therefore, even procedures that involve mild

	pain such as tooth extraction should be considered if there are already symptoms such as pain caused by the subject tooth enough to reduce the QOL. Furthermore, needless to say, check on the systemic conditions, drug administration status, confirmation with the primary physician in charge regarding the feasibility of tooth extraction and so forth will be necessary in advance before implementing invasive dental procedures. Paying attention to these in advance will prevent extra complications and lead to the maintenance or improvement of the QOL. It is also recommended that the treatment details and so forth should be selected while predicting the life prognosis mentioned in the previous section CQ6-2 when implementing dental procedures (see part of CQ6-5).
References	1） https://www.who.int/cancer/palliative/definition/en/
Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ6-5 Should a new denture be manufactured during terminal stage?

CQ6-5	Should a new denture be manufactured during terminal stage?
Recommendation	Although it should be determined case by case, it is better to handle by repair in most cases.
Explanation	[Background] Regarding the terminal stage of diseases such as cancer, for one thing the period of life prognosis is limited thus there is not enough time to manufacture a new denture, and for another it is difficult to become used to the new denture. In a study on terminal cancer patients which subjected 86 patients over multiple facilities, it was reported that 19 patients were using dentures (22.1%), 20 patients had dentures but were not using them (23.3%), and 31 patients required none (36.0%)[1]. Also for non-cancer terminal stages, similar to the above, it is difficult to manufacture dentures in the first place due to the difficulty in communication with dementia and so forth, and it is still difficult to become used to a new denture even if it can be manufactured. [Explanation] While there is no definition of the period of terminal stage, it is said to be relatively short for cancer and so forth, and long for frailty and non-cancer diseases such as dementia. It is often weeks or months (several months) in the case of terminal stage for cancer, and it would be too late unless the denture is manufactured in a hurry if it is to be manufactured. It is also a problem that there is little time to become used to the denture. In addition, it may be difficult to manufacture a new denture in the first place due to the difficulty in communication, or denture is not required as the patient has difficulty with oral intake during non-cancer terminal stages, even if the terminal stage itself is long enough to manufacture a new denture. However, since dentures also contribute to the recovery of facial configuration, it would be better to have a

	denture from the viewpoint of QOL. It is practical to handle by repairing the denture if there is an existing denture instead of manufacturing a new denture for both cancer and non-cancer diseases during the terminal stage. Many patients especially during the terminal stage of cancer have dentures but are not using them. Repairing such denture can shorten the period until wearing and therefore may contribute to oral intake under as good conditions as possible during the limited remaining opportunities for oral intake. Repairing the denture to be available for the patient would be meaningful also for the End-of Life care after death restoring the facial configuration for funeral and so forth.
References	1）Japanese Society of Gerodontology. Report of a research project on the involvement of dental hygienists. 2017.
Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ6-6 How should oral care be provided during terminal stage?

CQ6-6	How should oral care be provided during terminal stage?
Recommendation	While oral care with little pain should be attempted with priority on QOL, measures against mouth dryness, which is a highly frequent symptom, should be noted.
Explanation	[Background] Oral care should be implemented to improve the oral cavity environment, which worsens during the terminal stages of both cancer and non-cancer types[1-7].

[Explanation]

As described in CQ6-3, the oral cavity environment of a patient in the terminal stage tends to worsen. It is also difficult for the patient to do their own mouth cleaning during the terminal stage in many cases. Leaving it unattended may allow infections inside the oral cavity such as caries and periodontitis to worsen and result in symptoms such as pain, bleeding and swelling. It will deteriorate the QOL considerably as a consequence. Furthermore, the bacteria in oral cavity which multiply as a result of being left unattended may cause aspiration pneumonia. It is said that many deaths of the patients of Alzheimer dementia, who comprise a large percentage of non-cancer terminal stage, are caused by pneumonia[8]. Therefore, it becomes necessary to implement oral care as a part of nursing care, improve the oral cavity environment and do our best to maintain or improve the QOL. While it is natural to implement oral care to maintain good mouth cleaning conditions or improve the conditions, moisturization and moisture retention also become important during oral care in the terminal stages of both cancer and non-cancer patients, as they tend do have dry mouth symptoms. Patients in their terminal stage tend to suffer intravascular volume depletion, and are often difficult to facilitate salivary secretion. It is therefore necessary to supplement moisture from an outside source, for example by holding a piece of ice in the oral cavity. In addition, various oral cavity moisturizing

agents are commercially available and used to improve the dry mouth symptoms in the recent years. The patients in their terminal stages are also often susceptible to infections as they suffer malnutrition, and prone to oral mucosal diseases such as oral candidiasis and mouth ulcer when mouth dryness conditions continue. In this case, treatment should be provided using steroid preparations for external use, antifungal agents, and surface anesthetic for the purpose of pain control.

References

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Strength of evidence

No evidence

Reliability based on literature

Reliability based on literature
B: There are one or more supporting reports.

CQ6-7 How should dietary support be provided during terminal stage?

CQ6-7	How should dietary support be provided during terminal stage?
Recommendation	While it is difficult to have sufficient oral intake in many cases, it is important to have the attitude to provide support so that the patient can continue oral intake under effortless and better conditions in the sense of improving the QOL.
Explanation	[Background] Even though the cancer patients in their terminal stages may be capable of oral intake until slightly before death in some cases[1,2], in many cases of terminal stages in non-cancer patients, the period during which oral intake is difficult continues for a long time. [Explanation] For both cancer and non-cancer types, the eating and swallowing functions deteriorate during the terminal stage. Since it is difficult to ensure oral intake of sufficient amount, it is rather important to give support with a focus on the quality of oral intake. The aspects of oral intake related to the maintenance and improvement of the QOL and dignity as a human become stronger during the terminal stage, rather than the aspect as a means for nutrient intake. The basic policy is to support so that the patients can eat as much of whatever they can or want to eat as possible whenever they want. In the case of the terminal stage for cancer, functions deteriorate rapidly, by reduced level of awareness and so forth, and result in difficulty to have oral intake several days before death. In non-cancer terminal stages, the patients often have difficulty in oral intake for long periods, as the terminal stage may be clinically determined based on whether the patient has difficulty with oral intake. It is necessary to provide support through oral care to help the patient make the best of the remaining few opportunities for oral intake and be capable of oral intake under better

conditions, and through dental treatments such as dentures in some cases during the terminal stage of cancer. In this case, it is also desired that the appropriate diet types should be suggested and the case handled with the knowledge and skills of eating and swallowing rehabilitation.

The process of non-cancer terminal stage is long. The terminal stage of dementia, in particular, can also be considered frailty, and becoming incapable of oral intake can be assumed a normal process for approaching death. While support should be provided within the possible range, the patient should not be forced to have excessive oral intake with too much focus on the amount of nutrition intake. It is important to keep an attitude to observe the patient's conditions well and provide support while taking into consideration the intentions of the family and so forth.

It must also be kept in mind that continued oral intake even in small amount makes the organs related to eating such as the oral cavity and pharynx work thus leads to activation of the self-cleaning functions of the oral cavity and pharynx, although it is not sufficient, which results in the care of oral cavity and pharynx.

While providing support for oral intake during the terminal stage is one of the roles dentists should play, it cannot be said that they have been able to become involved sufficiently at present. More active involvement is desired in the future. To do so, dentists need to become involved upon obtaining broader understanding on the properties of the terminal stage, including not only the systemic conditions but also how the conditions will change later and the intentions of the family, instead of focusing only on the oral cavity. It is also necessary to gain understanding of the physicians, nurses and families on the role of dentists during the terminal stage. We must promote mutual understanding, as dentists can provide dietary support during the terminal stage, and contribute to the subsequent management of oral cavity.

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Reliability based on literature	Reliability based on literature C: There are no supporting reports.

●Chapter 7: Dental hygienists

[Chapter 7: Participation of dental hygienists in visiting dental care]

When a dental clinic intervenes for a patient under home care or care at a facility, the involvement of dental hygienists becomes extremely effective. Many of the patients of visiting dental care are elderly patients who require nursing care and have difficulty in visiting the dental clinic. In many cases, the primary diseases which caused the state requiring care in the elderly of 65 years and older are dementia, apoplexy, frailty, Parkinson's disease and so forth. Therefore, poor oral hygiene, oral hypofunction, and eating disorder/dysphagia often occur in concurrence with the deterioration in oral self-care capability or the oral motor ability. It is possible to maintain the joy of eating for the elderly people at home and also contribute to the prevention of aspiration pneumonia and malnutrition through oral hygiene management, management of oral functions, and eating and swallowing rehabilitation provided by dental hygienists under the instructions of the dentist. To do so, it is necessary that the dental hygienists have learned and mastered the necessary knowledge, skills and attitude for visiting dental care in a similar fashion to dentists. We hope that this CQ will help as reference.

CQ7-1: Does the participation of dental hygienists in visiting dental care improve the oral hygiene conditions of the patient?
CQ7-2: Can the participation of dental hygienists in visiting dental care help prevent onset of aspiration pneumonia in the patient?
CQ7-3: Can the participation of dental hygienists in visiting dental care improve the dietary conditions of the patient?
CQ7-4: What is the appropriate frequency of intervention by dental hygienists in visiting dental care?
CQ7-5: What types of intervention should be implemented by dental hygienists in visiting dental care?

CQ7-1 Does the participation of dental hygienists in visiting dental care improve the oral hygiene conditions of the patient?

CQ7-1	Does the participation of dental hygienists in visiting dental care improve the oral hygiene conditions of the patient?
Recommendation	The oral hygiene conditions of the patients who become subject to visiting dental care have often deteriorated, and it is desired that dental hygienists, whose specialty is to manage oral hygiene, participate actively upon receiving instructions from the dentist.
Explanation	[Background] Many of the patients of visiting dental care are elderly people who require nursing care. The most frequent causes of care requirement include many neuromuscular diseases such as dementia, cerebral apoplexy, frailty, and Parkinson's disease[1]. Therefore, they are not self-reliant in oral care, and often present poor oral hygiene due to oral hypofunction[2]. It is important that dental hygienists participate in visiting dental care and implement specialized oral hygiene management to improve the oral hygiene conditions. [Explanation] We have not been able to find any intervention studies that investigated whether the participation of dental hygienists who received instructions from dentists providing visiting dental care contributes to the improvement of the oral hygiene conditions of the patients. However, most cases of visiting care in the actual clinical field are provided in coordination between dentists and dental hygienists, as the practice according to the national insurance system. In visiting dental care in the systems specified by the national government, dentists provide the necessary advice and instructions for recuperation from the viewpoint of medical management in dentistry as guidance for management of in-home medical long-term care under long-term care insurance, based on the physical and mental properties, the conditions of

	living and so forth. Meanwhile, dental hygienists receive the instructions from the visiting dentist and provide the hands-on guidance on mouth cleaning, cleaning of the plate denture, and eating and swallowing functions as instructions necessary for recuperation instead of simple instructions on daily mouth cleaning. While the guidance for management of in-home medical long-term care by a dentist is limited to twice a month, the guidance for management of in-home medical long-term care by dental hygienists can be provided up to 4 times per month as necessary. This indicates the importance of their participation.
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Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ7-2 Can the participation of dental hygienists in visiting dental care help prevent onset of aspiration pneumonia in the patient?

CQ7-2	Can the participation of dental hygienists in visiting dental care help prevent onset of aspiration pneumonia in the patient?
Recommendation	The specialized oral hygiene management by dental hygienists who received instructions from the dentist may prevent the onset of aspiration pneumonia.
Explanation	[Background] The patients who are subject to visiting dental care may suffer dysphagia depending on the type of systemic disorder, and prevention of aspiration pneumonia is important. Deterioration in eating and swallowing functions as well as coughing functions, undernutrition, systemic immunity, poor oral hygiene, drugs and so forth are related to the onset of aspiration pneumonia, and comprehensive measures against each of them are necessary[1)]. It is therefore important that dental hygienists who received instructions from the dentist participate in visiting dental care, provide specialized oral hygiene management and contribute to the prevention of aspiration pneumonia. [Explanation] There are several intervention studies on whether the participation of dental hygienists who received instructions from the dentists providing visiting dental care prevents the onset of aspiration pneumonia in the patient. Yoneyama, et al. subjected elderly people living in facilities and compared the rate of pneumonia onset, the rate of fever onset, and the number of deaths caused by pneumonia over 2 years between the intervention group for which dentists or dental hygienists had provided specialized oral hygiene management at the frequency of once or twice per week and the control group who had continued the daily mouth cleaning. Their results showed that the rate of pneumonia onset, the rate of fever

onset, and the number of deaths caused by pneumonia were all significantly lower in the intervention group[2,3]. There is also another report that claimed that the provision of oral hygiene management for elderly people living at home who required nursing care and visited facilities for day care led to suppression of pneumonia onset[4]. Specialized oral hygiene management by dental hygienists can reduce the number of oral bacteria which can become the cause of aspiration pneumonia. In fact, the effects of bacteria reduction by oral hygiene management have been reported, including a significant reduction in the number of bacteria with oral hygiene management once a week by dental hygienists on elderly people living in facilities who required nursing care, compared to daily mouth rinsing with popidone iodine[5,6].

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Strength of evidence	B (intermediate): There is intermediate certainty for the estimated value of the effect
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ7-3 Can the participation of dental hygienists in visiting dental care improve the dietary conditions of the patient?

CQ7-3	Can the participation of dental hygienists in visiting dental care improve the dietary conditions of the patient?
Recommendation	Specialized oral hygiene management and oral function management provided by dental hygienists who received instructions from the dentist may help improve the eating and swallowing functions, and even the dietary conditions of the patient, depending on the patient's systemic conditions.
Explanation	[Background] Since the patients who are subject to visiting dental care often have eating disorder/dysphagia, they do not have favorable dietary conditions in many cases. This results in not only undernutrition but also inhibition of the joy of eating. It is therefore important that dental hygienists who received instructions from the dentist participate in visiting dental care and improve the dietary conditions of the patient. [Explanation] There are few intervention studies on whether the participation of dental hygienists who received instructions from the dentists providing visiting dental care improves the dietary conditions of the patient. Many of the patients of visiting dental care have eating disorder/dysphagia. Eating disorder/dysphagia not only increases the risk of undernutrition, dehydration, aspiration pneumonia, suffocation and so forth but also inhibits the patient's joy of eating. In visiting dental care, it is important that instructions on the dietary type and food intake methods appropriate for the ability to eat are provided upon properly evaluating the systemic conditions and the eating and swallowing functions. It is thus extremely meaningful that dental hygienists who received instructions from the dentist provide oral function management and participate in eating and swallowing rehabilitation. It has been reported that

	provision of the so-called functional oral care by dental hygienists once a week as group training to elderly people living in facilities increased the maximum tongue pressure 6 months later[1]. Since the maximum tongue pressure is related to the dietary type of elderly people who require nursing care[2], it is assumed that oral function management by dental hygienists may lead to the improvement of dietary type for the patient.
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Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

CQ7-4 What is the appropriate frequency of intervention by dental hygienists in visiting dental care?

CQ7-4	What is the appropriate frequency of intervention by dental hygienists in visiting dental care?
Recommendation	It is considered appropriate for dental hygienists to intervene at the frequency of approximately once a week to twice a month upon receiving instructions from the dentist, in order to provide oral hygiene management and oral function management properly in visiting dental care.
Explanation	[Background] Based on the viewpoint of aspiration pneumonia prevention and provision of dietary support, regular intervention by dental hygienists is desired for the patients of visiting dental care upon sufficient coordination with dentists. [Explanation] Many of the patients of visiting dental care have poor oral cavity environments, and often suffer troubles in oral cavity functions in lips, tongue and so forth. These then lead to deterioration in mastication and swallowing functions, so that the patients often suffer various levels of eating disorder/dysphagia. It has been shown that oral hygiene management by dental hygienists once a week is effective if the purpose is prevention of aspiration pneumonia [1,2,3]. Regarding oral function management, oral function training even twice a month has been shown to be effective[4]; however, in eating and swallowing rehabilitation, it is important to receive instructions from the dentist and observe the progress in change of dietary type or instruction on the method of food intake. Furthermore, in the long-term care insurance system, the guidance for management of in-home medical long-term care by dental hygienists is limited to 4 times per month. Based on the above, intervention of dental hygienists at the frequency of approximately once a week to twice a month while taking into consideration the systemic conditions of the

patient and the degree of eating disorder/dysphagia is recommended.

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Strength of evidence

B (intermediate): There is intermediate certainty for the estimated value of the effect.

Reliability based on literature

Reliability based on literature

B: There are one or more supporting reports.

CQ7-5 What types of intervention should be implemented by dental hygienists in visiting dental care?

CQ7-5	What types of intervention should be implemented by dental hygienists in visiting dental care?
Recommendation	Not only oral hygiene management but also oral function management should be provided in visiting dental care upon receiving instructions from the dentist and also based on regular assessment. In addition, the environment in which it is easier for elderly people to receive dental treatments should be prepared by the dental hygienists as they actively connect the oral troubles to dental treatments and provide assistance in dental care upon sufficiently grasping the physical and mental conditions of the patient. It is also anticipated that they provide sufficient coordination with nursing care from the viewpoint of life support centering on diet.
Explanation	[Background] When dental hygienists intervene in visiting dental care upon receiving instructions from the dentist, it is extremely important that they not only provide oral hygiene management but also always have the viewpoint of oral function management, capture any necessity for dental treatment, and give assistance in dental care based on the physical and mental properties of the patient. It is also desired that intervention should be made including interprofessional collaboration members who are involved with the patient and the viewpoint of life support such as dietary support. [Explanation] Unlike the places of medical services such as clinics and hospitals, visiting dental care is a medical service provided at the place of living, such as the home of the patient and the facility the patient is admitted to. In addition, the patients often receive nursing care services. Therefore, it is important to work and cooperate with interprofessional collaboration

members in medical care and nursing care, and the viewpoint of life support becomes necessary in order to do so. Dental hygienists should provide oral hygiene management including mouth cleaning and plate denture cleaning after receiving the instructions from the dentist and grasping the oral hygiene conditions, systemic conditions and living conditions of the patient. Since oral hygiene and oral functions are closely associated with one another, it is necessary to also grasp the conditions of the patient's oral functions properly at the same time. They should also participate in eating and swallowing rehabilitation upon ensuring sufficient coordination with the dentist and the interprofessional collaboration members. In eating and swallowing rehabilitation, dental hygienists may provide direct training with the use of compensation methods (diet type adjustment, posture adjustment, and eating method adjustment) in addition to indirect training, under instructions of the dentist. As viewpoints of dental specialists, it is important that they regularly evaluate the oral hygiene and oral functions in particular and grasp the needs for dental treatments to connect all of them to treatments by dentists[1)]. It is often the case that elderly patients who require visiting dental care and nursing care as well as the family are not aware of the problems in the oral cavity. It is therefore important that dental hygienists as dental specialists actively discover the problems in oral cavity and connect them to dental treatments by the dentist. They should also prepare the environment which makes it easier for the patient to receive dental treatments physically and mentally by sufficiently grasping the physical and mental properties of the patient and assisting in dental care.

References

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Strength of evidence	No evidence
Reliability based on literature	Reliability based on literature C: There are no supporting reports.

[Case]

A case example in which a dental hygienist implemented oral hygiene management and dietary support in visiting care
Patient: 78-year-old female
Name of disease: Dementia with Lewy bodies
Chief complaint: Wish to eat from the mouth
Outline: Dementia with Lewy bodies (hereinafter referred to as DLB) is a progressive disease in which severe dysphagia is often observed in the later stages of onset, and many of the patients end up with gastric fistula establishment. Meanwhile, there are cases in which eating and swallowing functions are not properly evaluated before gastric fistula establishment. In this case, the DLB patient who had gastric fistula established and the family expressed a wish to continue oral intake, and a dental hygienist provided dietary support in addition to oral hygiene management under instructions of the dentist after receiving a request for visiting care. ADL was total assistance with good eye opening and unclear speech. Although the patient had enteral nutrition from the gastric fistula, the care giver (husband) and the patient had a strong wish to continue oral intake, and the care giver (husband) was continuing to give small amounts of raw fish, fruits and so forth for oral intake.
Problems: The patient was not given sufficient oral care, and dental treatment had not been provided even though some had been necessary. The degree of nursing care requirement was high, and it was difficult to visit a dental clinic. The swallowing functions were observed to have deteriorated, making it difficult to use oral intake as nutrition intake. However, it was considered possible to continue oral intake on a level for enjoyment.
Measures: To provide oral hygiene management, evaluate the eating and swallowing functions properly, and maintain the joy of eating as long as possible with consideration for prevention of aspiration pneumonia.

Date	Progress	Measure and policy	Applicable CQ
At initial diagnosis BMI: 18.0 (undernutrition)	[Problems] ① Poor oral hygiene	① Improvement in poor oral hygiene conditions with oral hygiene management	CQ7-1

Amount of nutrition:
1600 Kcal/day
Oral intake level:
Minute intake for enjoyment

by a dental hygienist once a week and instruction on mouth cleaning to the family

② Caries

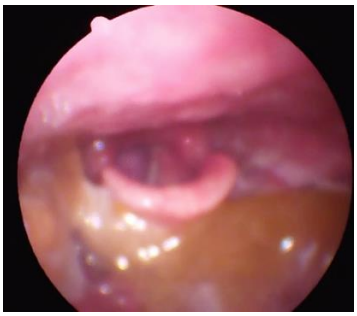
CQ7-5

② Reporting to the dentist to implement caries treatment

CQ7-3

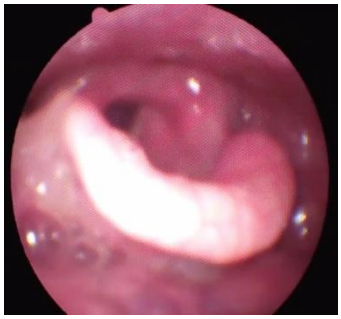
③ Eating disorder/dysphagia

③ It was found that the eating disorder/dysphagia was at the level of moisture aspiration in VE inspection by the dentist. => Eating and swallowing rehabilitation under instructions of the dentist



Proposal to use a smaller spoon as the spoon being used for

CQ7-3, 4

Progress BMI: 18.0 (undernutrition) Amount of nutrition: 1600 Kcal/day Kcal/day Oral intake level: Oral intake of a bite of softened food and thickening liquid for enjoyment during lunch and dinner	① Eating disorder/dysphagia	assistance was large  ① Regular VE evaluation by the dentist. Eating and swallowing functions  were maintained, and oral intake was continued. To prevent aspiration pneumonia, oral hygiene management by a dental hygienist once a week was continued. Thanks to the cooperation of the family, oral hygiene is kept in good conditions.

●Chapter 8: Restaurants for dysphagia

[Chapter 8: Group for restaurants with measures for dysphagia]

While home care is being promoted to help people live in their familiar communities, the environment surrounding the patients of eating disorder/dysphagia as well as the awareness of the medical and dental workers regarding dietary support have changed greatly, with various efforts being implemented in different areas. As a consequence, provision of dietary support in the field of home care and care facilities has become commonplace. However, the barrier is still high for the patients of eating disorder/dysphagia to go out and eat in restaurants. The restaurants to accept the patients do now know what measures can be taken for patients of eating disorder/dysphagia, and many do not actively publicize it even if they are accepting the patients. Furthermore, at schools, the requests of the guardians to inject shots of nutrients or mixer meals from the gastric fistula of children with eating disorder/dysphagia during lunch time are not approved in many cases due to concerns about safety at present. While various types of analysis and advice from experts will be necessary in order to address these matters safely, there have been few such reports, and the matter remains unresolved for many years under vague uneasiness. This section will explain the following to help solve these issues.

CQ8-1: Status for popularization of measures for eating disorder/dysphagia at restaurants and future issues

CQ8-1 Status on popularization of measures for eating disorder/dysphagia at restaurants and future issues

CQ8-1	Status on popularization of measures for eating disorder/dysphagia at restaurants and future issues
Recommendation	Going out to eat at restaurants creates an opportunity for elderly people and children with eating disorder/dysphagia to participate in the society, and improve their QOL. As there are remaining issues in terms of cooking and facilities in order to popularize measures for eating disorder/dysphagia at restaurants, it is important to make continuous efforts to solve these issues in the future.
Explanation	

In order to make restaurants which can serve patients of eating disorder/dysphagia more popular, the presence of the medical institutions which support the system is essential. However, the information on which medical institutions could provide support for eating disorder/dysphagia, which was a prerequisite, had been unclear in the first place. It was therefore decided that mapping of the medical resources should be started. As the first stage of this effort to create a website on a map of medical resources for eating and swallowing, a questionnaire survey was conducted for medical institutions in FY 2014. Since it was practically impossible to conduct an exhaustive survey, the initial stage survey was conducted through study groups related to eating and swallowing and so forth, and approximately 900 institutions responded that they could provide support for eating and swallowing issues. Approximately 600 of those also agreed on information disclosure. Based on the above data, a website on eating and swallowing medical resource map (Fig. 1) was opened on August 15, 2015.

Additional analysis on the registered map was then continued to analyze the regions where there were no medical institutions to provide support even though there were many

elderly people who might have eating disorder/dysphagia, and activities to enlighten the clinics which provided support for eating disorder/dysphagia at the time were implemented. As a consequence, dissemination of knowledge was advanced and the number of medical resources registered increased to approximately 1300, resulting in the establishment of the social infrastructure to provide regional dietary support in some degree. Starting in September 2016, registration of restaurants which can be used by eating disorder/dysphagia patients was begun to clarify the regional resources to enable "outing in a state requiring nursing care," and approximately 50 restaurants have registered as of November 2018 (Figs. 2 and 3).

The current state where we face various issues was also revealed in the process of our activities to register restaurants. The current situation is that popularization has not advanced especially in restaurants that provide support to children with eating disorder/dysphagia due to the seriousness and diversity in primary disease. The study group therefore conducted a survey on children with eating disorder/dysphagia and their guardians who live in the region and found the current situation to be as follows (Fig. 4).

The daily eating conditions comprised of 19% with only tube feeding such as gastric fistula, 60% who combined tube feeding such as gastric fistula with oral intake, and 21% with only oral intake. As the type of diet, 70% was eating paste food, 6% chopped food, 4% bite-size food, and 9% normal food. For food preparation, the most popular style was a combination of home-cooked meals prepared by the guardian and commercially available meals depending on the situation, which corresponded to 62%, while 32% ate only the home-cooked meals prepared by the guardian, and 6% only the commercially available meals. In addition, a half of them (49%) used thickening agents.

As situation of outing, it was found that most people used their private automobiles (98%) for transportation, even

though some also used public transportations such as buses (11%) and trains (23%). The frequency of outing was every day to several times a week, indicating that the disorder did not prevent the patients from going out much. It is surmised that the tax incentives, subsidy systems and so forth that are available for purchasing private automobiles as well as the well-established state of social security system to support the children with eating disorder/dysphagia and their guardians are also in the background for this result.

On the other hand, as to the frequency of eating out, many children with eating disorder/dysphagia were experiencing only once in several months or almost no opportunity to eat out, even though some children with eating disorder/dysphagia had high frequency to eat out at several times a month or week; 19% of children with eating disorder/dysphagia had no opportunity to eat out. As for wishes from the guardians, more than 80% said they "wish to eat out but cannot," or "wish to eat out more often," even though more than half of them were satisfied about being able to go out. This indicated the situation where they could not eat out for some reason, even though the guardians wished to increase the opportunities to eat out.

As for locations where they wished to eat out, family restaurants and fast food restaurants were named in addition to hotel restaurants and local restaurants. As for requests to the restaurants regarding cooking, many wished to "have the meals ground with a mixer," "use a grinding bowl or cooking scissors," and those regarding facilities included many requests for establishment of private rooms and barrier-free facilities as well as provision of power supply for using mixers and lending of cooking utensils (kitchen scissors) were seen (Fig. 5). To improve the acceptance of children with eating disorder/dysphagia at restaurants, it is essential for the restaurants to ensure safety and eliminate the vague anxiety. It is considered that further investigation will be necessary for disclosing the details about meals that suit the disease state

of each child with eating disorder/dysphagia in order to do so. Furthermore, by transmitting the demands for the establishment of the environment in restaurants that were revealed in this study to the restaurants, it is possible that the awareness of the restaurants on acceptance of children with eating disorder/dysphagia will change. At present, the reasons why restaurants remain reluctant to accept them include "not knowing what to provide," and "no assurance that the safety of the meals can be provided." However, the guardians will be able to process the meals into forms that are suitable for each child if the environment to provide support to children with eating disorder/dysphagia is established, such as allowing them to bring aspirators or use power supplies. Since there are no laws, regulations and so forth which forbid the guardians to process the meals served at a restaurant and give them to children with eating disorder/dysphagia as long as the restaurant shows understanding, it will be possible for the restaurants to provide meals without taking any safety risks. This may lead to creation of more opportunities for children with eating disorder/dysphagia and their guardians to eat out (Fig. 6).

References

1) Longevity Science Research Project 2016. A study on community comprehensive care for swallowing and nutrition of the elderly.

Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

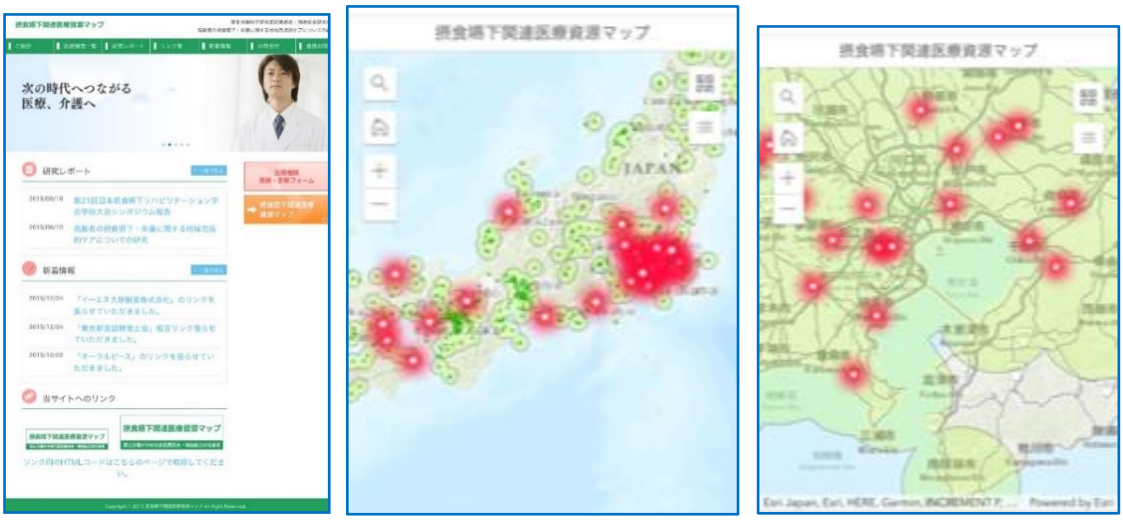


Fig. 1: Map of medical resources related to swallowing which was disclosed on the website

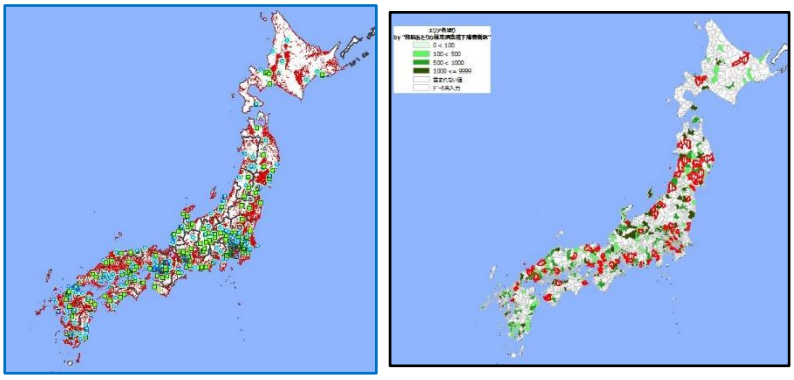


Fig. 2: Present state of the map (left: Coverage, right: Rate of reception)
Map: Kokusai Kogyo Co., Ltd.
Map information system: MarketAnalyzer, Giken Shoji International Co., Ltd.

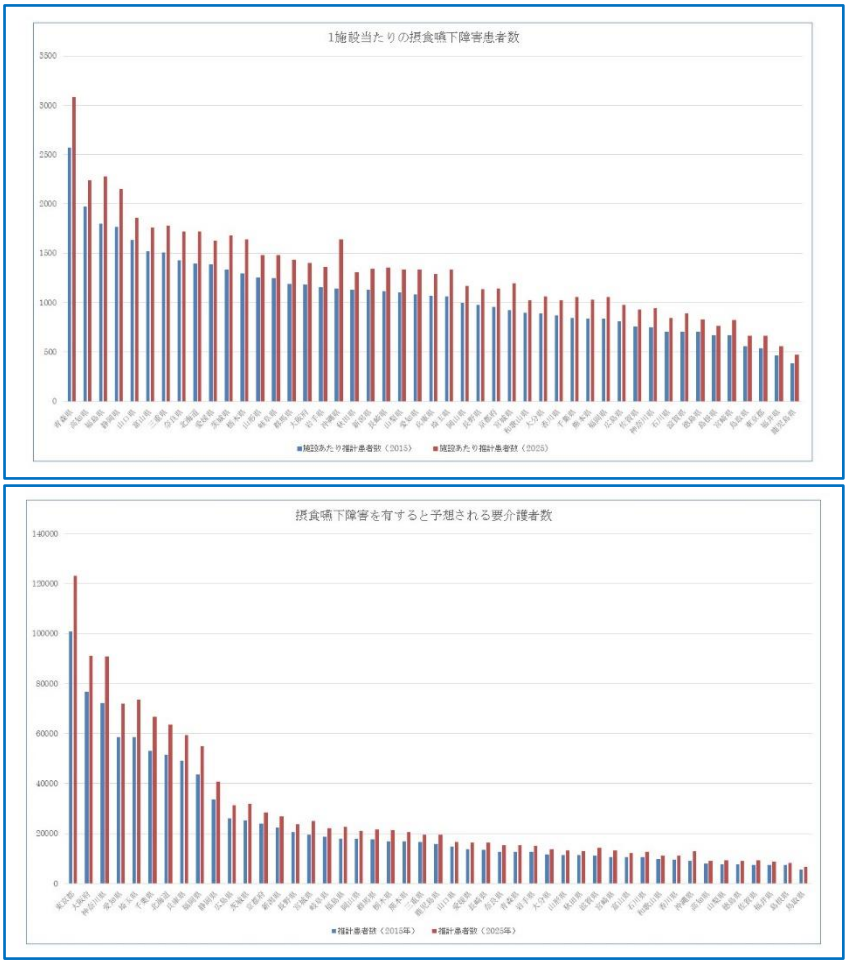


Fig. 3: Number of eating disorder/dysphagia patients per facility (top) and the number of people requiring nursing care presumed to have eating disorder/dysphagia

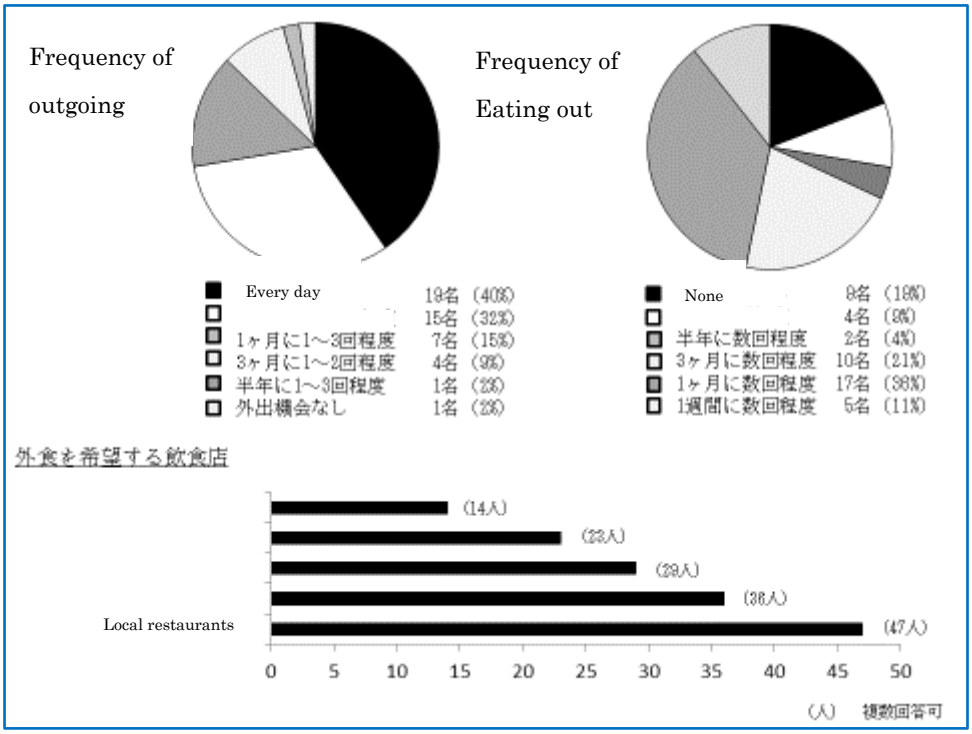


Fig. 4: Frequency of outing, situation and restaurants they wish to eat at (in japanese)

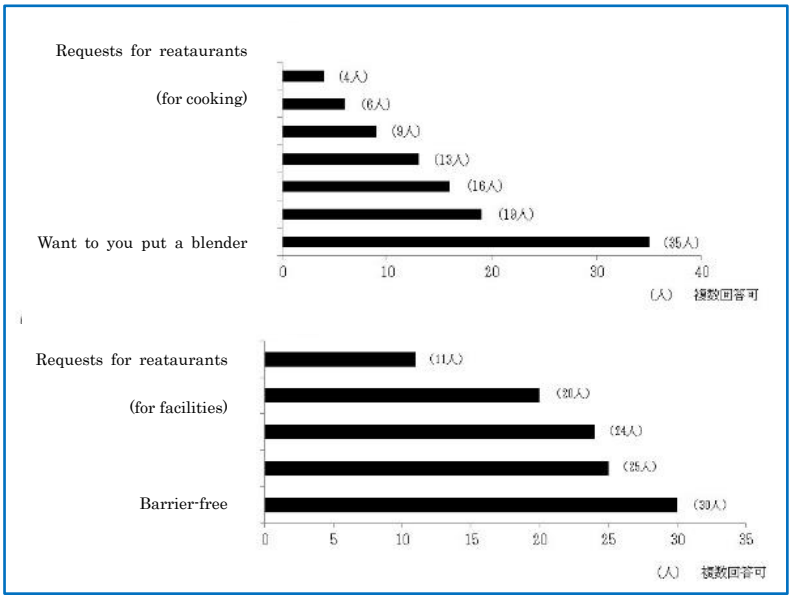


Fig. 5: Requests from guardians of children with eating disorder/dysphagia

Fig. 6: Processing of a kid's lunch
(Left: Kid's lunch before processing, Center: Lunch processed by the guardian, Right: How the meal is given to a child with eating disorder/dysphagia by shot injection from the gastric fistula after processing the meal into paste meal)

[Case]

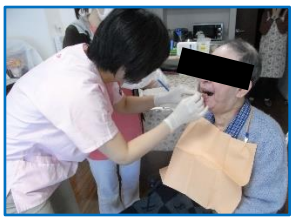
A case example which was handled in visiting care, in which the patient became able to eat out at restaurants after suffering eating disorder/dysphagia is introduced below.

Patient: 68-year-old male
Name of disease: Cerebral infarction, diabetes

Outline of the case:

The patient was maintaining oral intake even though he suffered left cerebral infarction and had hemiplegia as a sequela. A gastric fistula was established later when he had an onset of aspiration pneumonia. The patient later wished to "eat from the mouth," and a request was sent from the care manager in charge to a visiting dental care.

Main complaint: Wish for oral intake
Problems: Movement disorder in the muscles surrounding the oral cavity and tongue as a sequela of cerebral infarction and concurrent dysphagia
Measures: Information sharing and establishment of coordination with the physician in charge and other multiple occupations concerned to form common awareness in handling the issues faced as necessary.

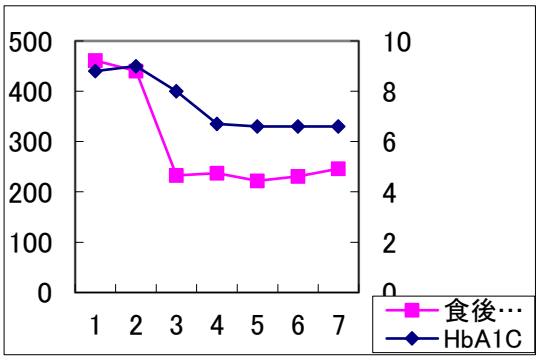
Date	Progress	Measure and policy	Applicable CQ
At initial diagnosis Nutrition intake by tube feeding only	[Problems] ① Chronic saliva aspiration ② Frequent fevers	① Indirect training such as ice massage and massage on the muscles surrounding the oral cavity ② Oral cavity care 	

A scene from oral care provided by a dental hygienist

A scene from rehabilitation with an ST

148 days later	① Appropriate conditions for starting direct training were unknown.	① Implementation of VE testing
161 days later	① Deterioration in larynx elevation While swallowing reflex was present, elevation of larynx was weak and even a small amount of jelly was seen to remain at the pharynx. ② Deterioration in tongue movements Disorder in sending food down due to deterioration in	① Improvement in larynx elevation with indirect training ② Indirect training such as training on the range of motion of tongue was implemented in concurrence with direct training using jelly to try to address improvements. ③ Improvement in high-order function disorder by an ST Gradual recovery in language functions was observed, and the patient started to say simple greetings such as “good morning” and “good-bye” from

	tongue movements ③ Aphasia caused by high-order function disorder Difficulty in swallowing under instruction (empty swallowing) or vocalization due to apraxia	being able to only utter sounds, then became able to sing a song with long lyrics. At the same time as the recovery of language functions, lung functions were strengthened, also improving the expectoration in case of aspiration.
212 days later	① Increase in diet type in concurrence with the improvements in swallowing functions and increase in the amount of food taken ② Deterioration in disease state in the primary disease (diabetes) in concurrence with the	① As the swallowing functions improved, the diet type changed from jelly food to paste food, chopped food and normal food. ② As the amount of oral intake increased, shift from the combination of a gastric fistula and oral intake to oral intake only was examined. However, it was paused due to an increase in the blood sugar value in the patient's diabetes. A request was made to a nutritionist to start giving instructions on appropriate meals and cooking to the family. Exercise therapy was also started, including an increase in rehabilitation

		increase in the amount of food taken	volume.  Changes in blood sugar value and HbA1c After changing the test food and contents of rehabilitation, they were able to improve these test values.	
589 days later	①	Creation of opportunities to go out	① Search for restaurants where they could eat out Restaurants where they could eat out were searched within the walking range from the house, and mode of transportation and so forth were examined. Since normal menus (sushi) could not be eaten, restaurants were asked if it was possible to bring in cooking utensils (cooking scissors).  A scene during meal  	CQ8-1

●Chapter 9: Care in remote areas and islands

[Chapter 9: Table of contents for care in remote areas and islands]

"Remote areas" in the field of medicine refer to areas which are mountainous areas, remote islands and so forth with poor conditions of transportation, nature, economy and society where it is difficult to ensure provision of medical care. In remote areas, closing of medical institutions, deterioration in transportation facilities, changes in regional division and so forth seem to occur due to regional characteristics and issues such as population decrease. There are thus many elderly people who live alone in isolated locations, even though they are supported by relatives or the local community. Furthermore, due to the poor medical and human resources compared to urban areas, there are many cases in which patients of oral diseases become dental care refugees as they are unable to visit a dental clinic and leave the diseases unattended. There is a concern for undernutrition, worsening of the systemic conditions, and deterioration in QOL as dietary life becomes neglected due to the oral disease being left unattended. This section therefore describes the infrastructure development and interprofessional collaboration in visiting dental care in remote areas, which have various different characteristics.

CQ9-1: What are the points for visiting dental care in remote islands and hilly and mountainous areas?
CQ9-2: Is sharing information with nursing care specialists (care managers) effective in visiting dental care in remote islands and hilly and mountainous areas?
CQ9-3: Is it necessary to plan life support from not only the viewpoint of treatment (cure) but also the viewpoint of care in visiting dental care in remote islands and hilly and mountainous areas?
CQ9-4: Is it necessary to have the viewpoint of personal aid with a focus on mitigating the pain of the patient and the family in visiting dental care in remote islands and hilly and mountainous areas?

CQ9-1 What are the points for visiting dental care in remote islands and hilly and mountainous areas?

CQ9-1 What are the points for visiting dental care in remote islands and hilly and mountainous areas?

Recommendation

Since remote islands and hilly and mountainous areas have many elderly people who live alone and are poor in medical and human resources compared to the urban areas, it is desired that a role-varying type care system with trans-disciplinary team approach for travel distance and time for visiting care, emergency measures, and the frequency of cares provided should be constructed in cooperation with the municipality and the central hospital. It is also effective to establish a system where remote diagnosis can be requested to a cooperating medical institution through some type of communication medium in case specialized oral cavity diagnosis is required.

Explanation

[Background]

Many residents of remote islands and hilly and mountainous areas live in their own houses and their lives are supported by relatives or the local community. However, the elderly people tend to become isolated as they continue living in their houses even when they are alone, and as the distance from the neighboring houses grow larger due to depopulation. In addition, dental care services cannot be provided thoroughly due to the small number of medical institutions, leading to the concern that the oral health level is deteriorating considerably. It is also expected that leaving the oral diseases of the residents unattended will result in undernutrition, worsening in systemic symptoms, and deterioration of QOL.

[Explanation]

Closing of medical institutions, deterioration in transportation facilities, changes in regional division and so forth seem to occur in remote islands and hilly and mountainous areas due to regional characteristics and issues such as population decrease. Because of these reasons, many elderly people live alone in isolated locations, even though they are supported by relatives or the local community[1)]. Furthermore, there are many cases in which these people are unable to receive care at dental clinics even when they suffer an oral disease and leave it unattended, ending up as dental care refugees, as these areas have fewer medical resources and human resources compared to urban areas. It is expected that they will suffer undernutrition, worsening in systemic conditions and deterioration of QOL and ultimately frail, as the oral diseases are left unattended and their diet becomes neglected. Therefore, it is considered that those who work in dental care can contribute to the extension of healthy life expectancy by providing regular traveling care in cooperation with the people in other occupations from the municipality and center hospitals. Even if there is no dental care worker, it is desired that a role-varying type care system should be constructed with a flexible team approach (trans-disciplinary team approach) to divide the work[2)] while each member looks for what they can do by establishing a system where limited human resources (occupations) conduct a check on the oral cavity. In addition to visiting dental care and guidance for management of in-home medical long-term care by dentists and dental hygienists, expectations are high regarding the usefulness of visiting dental care accompanied by a speech-

	language-hearing therapist or nutritionist, and coordination with visiting rehabilitation by a speech-language-hearing therapist from the long term care service office. Meanwhile, establishment of coordination with specialized medical institutions which can be requested with remote diagnosis or visiting dental care is also anticipated in case it is determined that diagnosis by a specialist is required.
References	1) Japan National health Insurance Clinics and hospitals Association: Health Promotion Project for the Elderly, 2018, March. 2) Saitoh E. Introduction of rehabilitation medicine. JSDR, 5(2):3-10,2001.
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ9-2 Is sharing information with nursing care specialists (care managers) effective in visiting dental care in remote islands and hilly and mountainous areas?

CQ9-2

Is sharing information with nursing care specialists (care managers) effective in visiting dental care in remote islands and hilly and mountainous areas?

Recommendation

Information sharing with the care manager is effective in ensuring smooth information sharing with the medical services of other areas and nursing care specialists even in remote islands and hilly and mountainous areas[1)].

Explanation

[Background]

Remote islands and hilly and mountainous areas do not have many medical institutions and suffer a shortage in medical specialists for home care and nursing care specialists. In addition, it is a matter of concern that the oral health level is deteriorating considerably as the dental care services are not provided sufficiently. Effectiveness is also anticipated in planning for medium to long term from the viewpoint of information sharing among the visiting nursing care team (not limited to the team from the same office but instead comprised of multiple occupations from different offices) for a certain patient, and from the viewpoint of raising the standard for the knowledge on oral health in other occupations, which is currently insufficient[2)].

[Explanation]

At home, it is important to share information with the family members living with the patient, other people in visiting care and nursing occupations, and those in day care-type services. The care manager plays the central role in this. Therefore, sharing information with the care manager is essential in ensuring smooth information sharing within the home care team in the area.

Due to the issue of population aging, trend for nuclear families and so forth, self-help and mutual help may not be provided sufficiently in remote islands and hilly and mountainous areas. Management of cooperation may also be insufficient due to shortage in specialist offices, and development and execution of the necessary and sufficient nursing care plan may be difficult as a result. It is therefore assumed that having the oral diseases of the residents unattended is leading to undernutrition, worsening in systemic symptoms, and deterioration of QOL.

It is desired that information sharing with the care manager should be considered even in the case of intervention by a dentist under only the medical insurance or the long-term care insurance, by ensuring information sharing among various different occupations. It may be effective in terms of information sharing for the care manager to accompany at the time of visiting care, not every time, but once in a while.

References

1) Japan National health Insurance Clinics and hospitals Association: Health Promotion Project for the Elderly, 2018, March.

2) The Yuumi Memorial Foundation for Home Health Care, Reports, 2015.

Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ9-3 Is it necessary to plan life support from not only the viewpoint of treatment (cure) but also the viewpoint of care in visiting dental care in remote islands and hilly and mountainous areas?

CQ9-3

Is it necessary to plan life support from not only the viewpoint of treatment (cure) but also the viewpoint of care in visiting dental care in remote islands and hilly and mountainous areas?

Recommendation

It becomes necessary to plan the medical care and nursing care at home based on the viewpoint of patient's life, in addition to the treatment plan with the purpose of dental treatment.

Explanation

[Background]

Remote islands and hilly and mountainous areas have shortages in medical and human resources compared to the urban areas. Furthermore, dental treatments on diseases in the oral cavity have been shown to be effective in improving the oral cavity functions. Meanwhile, daily care by the family and nursing workers who are responsible for home care is essential in maintenance and improvement of oral hygiene in addition to visiting dental care. In addition, the viewpoint of the patient's life, such as tableware, posture and cooking method, is essential for nutrition intake including oral intake, as well as the viewpoint of treatment. It is thus necessary to develop a plan based on the viewpoint of life in addition to the treatment plan for the purpose of dental treatment.

[Explanation]

By advancing dental treatment and having the patient maintain the subsequent oral cavity environment, it is possible to provide support for oral intake, prevent aspiration pneumonia, and even maintain or improve the QOL[1)]. However, it may be difficult to implement oral hygiene

measures sufficiently at the scenes of home care. In such cases, it is difficult to not only maintain the oral cavity environment after treatment, but also continue dental treatments smoothly. As a consequence, it may become necessary to review the eating method, type of diet and so forth, or an onset of aspiration pneumonia may be caused.

Therefore, the effects of dental treatments may be limited in many cases, and this can be anticipated before providing treatments. It is thus necessary to develop a plan which takes into consideration the fact that there are limits to the effects of intervention by dental treatments. In this case, it is more important to develop a plan to support the patient's life from the viewpoint of care[2]. It is important to coordinate with the family and other occupations in nursing care regarding the method of oral hygiene, denture handling and so forth in addition to dental treatments.

References

1) Japan National health Insurance Clinics and hospitals Association: Health Promotion Project for the Elderly, 2018, March.

2) The Yuumi Memorial Foundation for Home Health Care, Reports, 2015.

Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

CQ9-4 Is it necessary to have the viewpoint of personal aid with a focus on mitigating the pain of the patient and the family in visiting dental care in remote islands and hilly and mountainous areas?

CQ9-4 Is it necessary to have the viewpoint of personal aid with a focus on mitigating the pain of the patient and the family in visiting dental care in remote islands and hilly and mountainous areas?

Recommendation

Expression of pain in the information obtained from interviews through conversation with patients who socially isolated or feel lonely in life or their family members may function as an opportunity to search through the background for the onset of various complications. It is effective to utilize listening from the viewpoint of personal aid with a focus on the pain of the patient and the family and so forth.

Explanation

[Background]

There are fewer windows and methods for consultation in remote islands and hilly and mountainous areas compared to urban areas. Especially for elderly people who have limited methods of transportation, the opportunities to physically see people whom they can confide in become limited. This can easily result in isolation from the society. In addition, they may constantly have the feeling of loneliness even among other residents of the community or at home if the exchanges are sparse. In visiting dental care, information obtained from interviews in conversations with the patient who is in such a state of isolation or who feels lonely, or their family members may function as an opportunity to find the hotbed for the onset of various complications. To do so, it is effective to utilize listening from the viewpoint of personal aid with a focus on the pain of the patient and the family and so forth. It is also important in team structure to share this information with the care manager and those in other

occupations.

[Explanation]

The revision in nursing care insurance system in 2008 promotes cooperation to supplement the weakening self-help and mutual help. This is because it has become difficult to thoroughly cover all the needs of every elderly person or resident by cooperation and public help. This issue is more prominent in remote islands and hilly and mountainous areas.

It has become a role of those in occupations for providing home care to determine the elderly people (or residents demanding or requiring support) in "what" conditions should be connected to "what kind of" care and "when," in order to address medical care and nursing care which completes within the region.

However, it is difficult to ease the pain of the people which inevitably comes from aging, diseases and death, if we only offer prevention of diseases, mitigation of symptoms, enhancement of services to satisfy the needs of the elderly and their family, problem solving and cooperation. The viewpoint of assistance becomes necessary here. Assistance is to ease, mitigate and eliminate the pain[1)]. The viewpoint of assistance to the people (personal aid) is considered effective in mitigation of people's pain that comes from aging, diseases and death. Services that respond to needs and nursing plans that are oriented to problem solving cannot handle the pain that the elderly people have in their hearts. Typically, the pain lies in 'loneliness.' Assistance to ease, mitigate and eliminate the pain in elderly people from 'isolation' of experience of not being understood and 'isolation' of being cut off from the society should be handled with priority[2)]. It is anticipated that we grasp the

	background of the problem using personal aid methods such as listening during interview and share the information with other occupations in medical and nursing care including the care manager in order to do so.
References	1) Murata H. Philosophy of Care and Interpersonal Assistance. Kawashima Shoten, 43, 1998. 2) Murata H. 21th Workshop on Oral Health Care of the Inpatient. president's prospectus, 2018.
Strength of evidence	C (weak): The certainty for the estimated value of the effect is limited.
Reliability based on literature	Reliability based on literature B: There are one or more supporting reports.

●Chapter 10: Malalignment

[Chapter 10: Oral function survey mainly focusing on the status of intervention by dentists and malalignment in patients of severe eating disorder/dysphagia]

To grasp the dental issues such as malalignment, status of receiving visiting dental care and so forth in patients of severe eating disorder/dysphagia, we conducted a questionnaire survey through the associations of the families of patients in persistent vegetative state caused by brain injury and patients of xeroderma pigmentosum (XP). As a consequence, malalignment was observed in approximately 40% of the patients with persistent vegetative state, approximately 30% of patients with XP, and approximately 20% had no dentists that they saw regularly. There have been few findings on malalignment in the scenes of visiting dental care. The results of this survey indicated the possibility that the oral issues such as malalignment may depend on the number of years elapsed since onset, oral functions such as sialorrhea and whether there is oral food intake. It is surmised that intervention by visiting dental care at an early stage, measures after the occurrence of malalignment, and preventive measures are quite important, and that it will be necessary in the future to include measures against malalignment in visiting dental care promotion manual to be prepared, in addition to the measures in actual clinical scenes.

Patients of persistent vegetative state caused by brain injury and patients of xeroderma pigmentosum (XP) often have severe eating disorder/dysphagia related to deterioration in oral functions, and are often treated in visiting dental care. However, a report on the questionnaire survey in 2013 by the association of families of patients in persistent vegetative state said that the rate of involvement by a dentist in the patient receiving visiting care remained at 6.5%. In addition, XP occurs due to genetic defects in the ultraviolet DNA damage restoration system, and the patients present photosensitization, skin cancer, neuropathy and so forth. Regarding oral issues, the patients have been reported to combine dental problems such as eating disorder/dysphagia, temporomandibular joint arthrosis and malalignment, but the details have not been elucidated. In this study, we conducted a questionnaire survey subjecting the association of the families of patients in persistent vegetative state caused by brain injury and Japanese National Network of Xeroderma Pigmentosum (XP), in order to grasp the dental issues such as teeth alignment,

status of receiving visiting dental care and so forth in patients of severe eating disorder/dysphagia.

The study group prepared the questionnaire draft prior to the survey, and completed the final version of the questionnaire upon reflecting the opinions of both associations of families. The questionnaire items were comprised of (1) Basic information on age, gender, years elapsed since onset, (2) Motor functions, (3) Communication functions, (4) State of respiratory management, (5) State of sialorrhea and suction, (6) State of food intake, (7) Dental and oral issues including teeth alignment, and (8) Whether there was a dentist they saw regularly. The Ethical Review Board, Faculty of Dentistry, Tokyo Medical and Dental University was consulted on the contents of the questionnaire and study plan, and their approval was given on July 23, 2018 (D2018-013). We prepared distribution material putting together the informed consent form, consent form, consent withdrawal form, return envelope and so forth, and sent 548 sets to the association of the families of patients in persistent vegetative state caused by brain injury and 127 sets to the Japanese National Network of Xeroderma Pigmentosum (XP) to obtain response unsigned (**research results**). Since there have been practically no reports in this field, the basic Q&A on oral function survey is provided below, as well as a case example report. The questionnaire results are shown at the end. The questions selected in this document are listed as follows:

Q10-1: When does dysphagia start in a patient of xeroderma pigmentosum? And what are the symptoms?
Q10-2: In what cases of xeroderma pigmentosum patients is a gastric fistula formed?
Q10-3: How should we consider the necessity of dental care in home care patients in persistent vegetative state and so forth?
Q10-4: What are the cautionary points for impression taking (mold taking) to make a mouthpiece for malalignment?
Q10-5: For which patients is the preparation of the mouthpiece effective? And how long should they wear the mouthpiece?

Q10-1. When does dysphagia start in a patient of xeroderma pigmentosum? And what are the symptoms?

Answer: While there are individual differences, many start with choking around the age of 17, when they start using wheelchairs. Wheezing during or after meals is also a symptom to suspect the onset. Other indicators include taking time to finish a meal and decrease in body weight. Caution is required as the patient stops choking even when aspiration into the trachea occurs once aspiration becomes chronic. It needs to be suspected when the patient repeatedly suffers pneumonia.

Q10-2. In what cases of xeroderma pigmentosum patients is a gastric fistula formed?

Answer: It is when the patient starts choking often, presents wheezing after meals, clearly presents aspiration in tests, and starts to suffer pneumonia repeatedly. It may be necessary to form a gastric fistula when the patient starts losing weight, as it means that the patient is not capable of sufficient nutrition intake from the mouth. Forming the gastric fistula at the same time when tracheotomy is implemented is a choice for patients of xeroderma pigmentosum, as they are susceptible to the effects of anesthesia.

Q10-3. How should we consider the necessity of dental care in home care patients in persistent vegetative state and so forth?

Answer: When a patient in persistent vegetative state goes under home care, nursing care for 24 hours a day for 365 days a year in daily life becomes necessary. Nutrition management, phlegm suction, oral care and so forth are also important parts of nursing care. The results of a survey by this study group in 2018 indicated the possibility that the problems of the oral cavity such as malalignment may depend on the number of years elapsed since onset, oral cavity functions such as sialorrhea, and whether the patient has oral intake. Malalignment, in particular, needs

intervention of a dentist from an early stage also from the preventive viewpoint, as correction becomes more difficult as more years pass. Furthermore, it is better to request for visiting dental care including dental diagnosis and treatments of the problems in existing teeth and initial evaluation of the swallowing functions and nutritional state at the start of home care, before the patient has onset of aspiration pneumonia, dehydration or malnutrition. The frequency of later house calls should be set up and changed as necessary. While initial evaluation of swallowing functions and nutritional state can be done in visiting medical care, visiting dental care, visiting nursing care, in-home visiting nutrition management and so forth, it is recommended that the care manager is consulted as the system varies depending on the municipality.

Q10-4. What are the cautionary points for impression taking (mold taking) to make a mouthpiece for malalignment?

Answer: If the patient is closing the mouth due to excessive muscle tone in the muscles surrounding the oral cavity, it would be difficult to open the mouth and thus impression taking for making a mouthpiece may be inhibited. In this case, it is necessary to insert the forefinger from the corner of the mouth toward the vestibule of the oral cavity and exclude the lips and buccal mucosa. Using mouth opening aids such as Anglewider is also recommended. If the patient is closing the mouth due to aggravation of masseter reflex or teeth gritting, the effective methods include pushing the lower jaw down and facilitating the jaw opening reflex by stimulating the K-point. It is also effective to use a bite block to maintain mouth opening. If the existing impression tray does not fit the dentition due to extreme inclination of the tooth axis, constriction of dental arc and so forth, preparation of an individual tray should also be examined. Caution shall be employed not to allow the excessive impression material from flowing into the pharynx during impression taking. Alginate impression materials with which the impression is easier to remove than silicone impression materials are often used as the impression material. After the impression has been taken, the impression materials remaining in the oral cavity need to be removed quickly using fingers or tweezers to prevent aspiration or accidental ingestion.

Q10-5. For which patients is the preparation of the mouthpiece effective? And how long should they wear the mouthpiece?

Answer: A case in which a mouthpiece was mounted is described below.

[Case] 46-year-old female [Name of disease] Subarachnoid hemorrhage (at 44 years of age)
[History of present illness] Presented high-order brain dysfunction (attentional dysfunction, memory disturbance), dysarthria, aphasia, and anticipatory stage and oral stage dysphagia due to subarachnoid hemorrhage.
Tracheostomy cannula was removed after the patient was transferred to the convalescent stage hospital, and intake of full gruel and softened food became possible for all 3 meals after swallowing training (Gr. 8 on Fujishima's Grade). While progress had been smooth for approximately 2 months, accumulation in the oral cavity became gradually more evident, and the patient started failing to send food from the oral cavity into the pharynx. At present, the patient only has oral intake of drink-type nutritional supplementary foods to ensure necessary nutrition intake. Home care was begun after being discharged from the convalescent stage hospital, and visiting care was requested to this clinic from the family and the visiting physician in charge of the patient.
[Findings on oral cavity at initial diagnosis]
Tongue movement was sluggish. Even though movement to the left or right was possible, the tongue does not go beyond the mandibular anterior teeth when thrust out.
The patient had a habit to bite the lower lip with maxillary anterior teeth.


Mandibular anterior teeth had considerable inclination toward the tongue.
The patient was unable to process the saliva, and a large amount of saliva was

accumulated in the oral cavity.

[Evaluation of swallowing functions (sitting position on the wheelchair, mid-position)]

Overstrain on the tongue was observed, and the patient was incapable of sending solid matter as the dorsum of tongue was constantly in contact with palate.

The patient was capable of sending liquids, and there was no delay in induction of swallowing reflex. No problem in the pharyngeal stage was observed.

[Preparation of an oral appliance]

To improve the habits inside the oral cavity, a mouthpiece-type oral appliance to mount on the mandibular dentition was prepared. A self-curing resin was built up on the lip side (outside) of mandibular anterior teeth of the appliance to add thickness, so that lower lip would not enter the gap between the upper and lower front teeth.

Instruction was given to wear it for short periods to get used to it first, then to wear during periods other than meals within the reasonable range.

[Progress]

Pressure of the lower lip was eliminated thanks to the appliance. Because of this, more prolabium was exposed compared to before wearing the appliance.

The habit to bite forcefully with the maxillary anterior teeth was improved, and the tension in mentalis muscle was mitigated.

Swallowing training was continued in coordination with a speech-language-hearing therapist, and the patient is now able to ease the tension in the lips voluntarily and maintain this state even without wearing the appliance.

The oral cavity functions are also showing a tendency to improve gradually, and the patient is able to swallow the saliva with connected swallowing movements from mastication to sending in after intake of solid matters.

The physical therapist reported that the patient was able to stand firm better in an upright position when she was wearing the appliance.

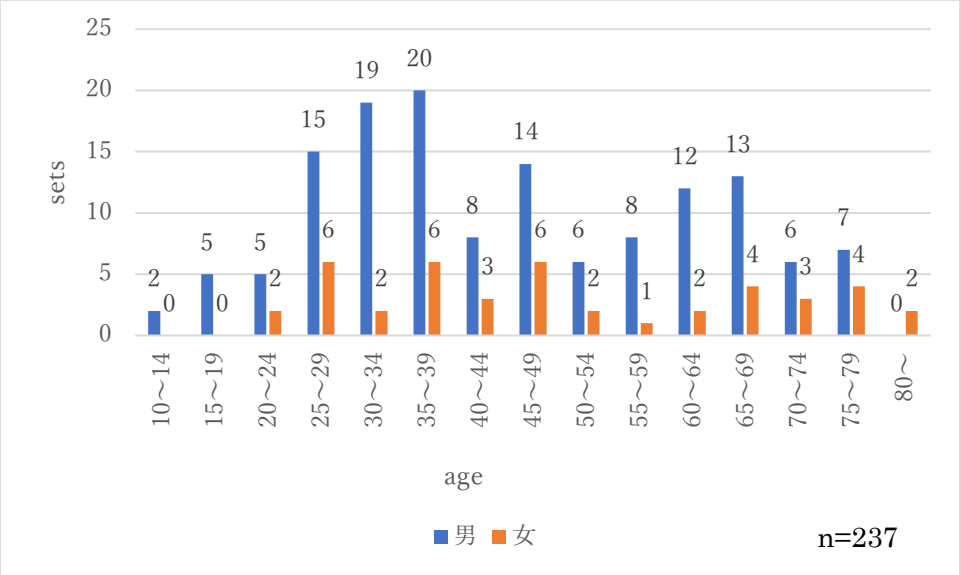
Measures of orthodontics and so forth are often difficult to take. Since advances in

malalignment can be a factor for worsening in oral stage disorders, it was considered necessary to take preventive measures with an early intervention of the dentist.

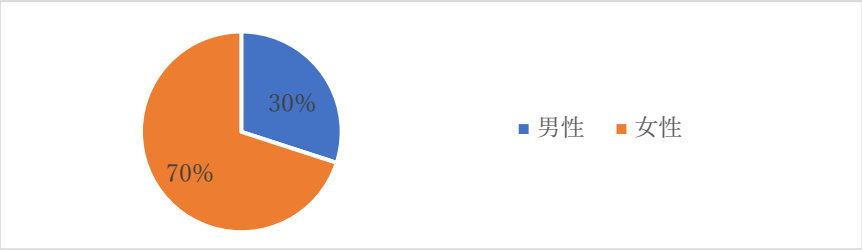
[Research results]

The number of questionnaires returned was 320/675 sets.

The number of questionnaires returned from the associations of the families of patients in persistent vegetative state caused by brain injury was 237.



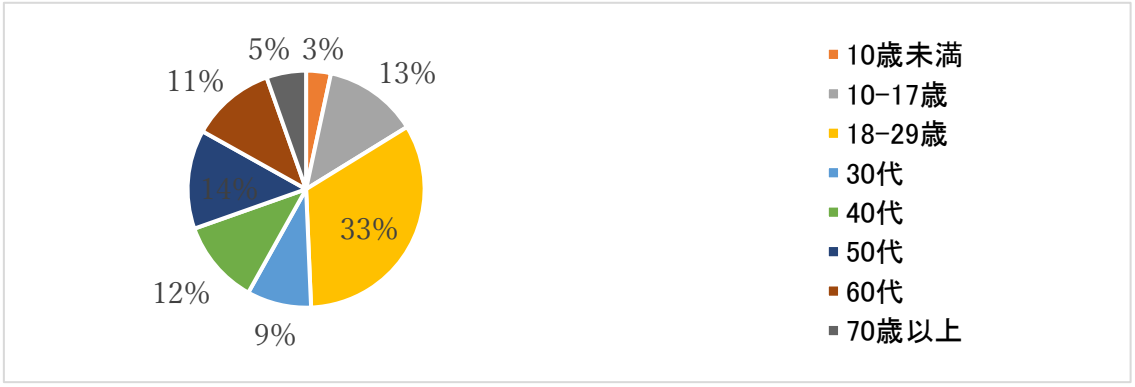
Male /Female



Male /Female

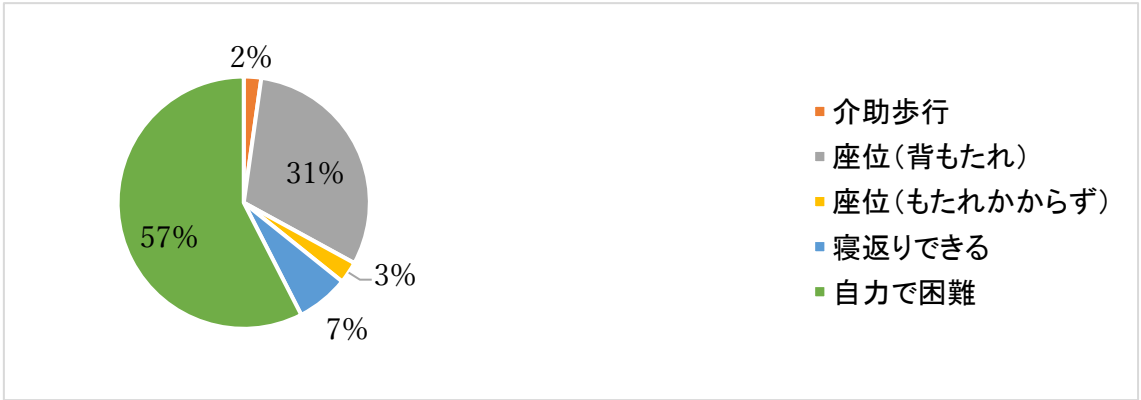
The average age of the subject patients was 44.4 years (1 to 89 years old, median value: 42 years), and the male to female ratio was 7:3.

●Age at onset



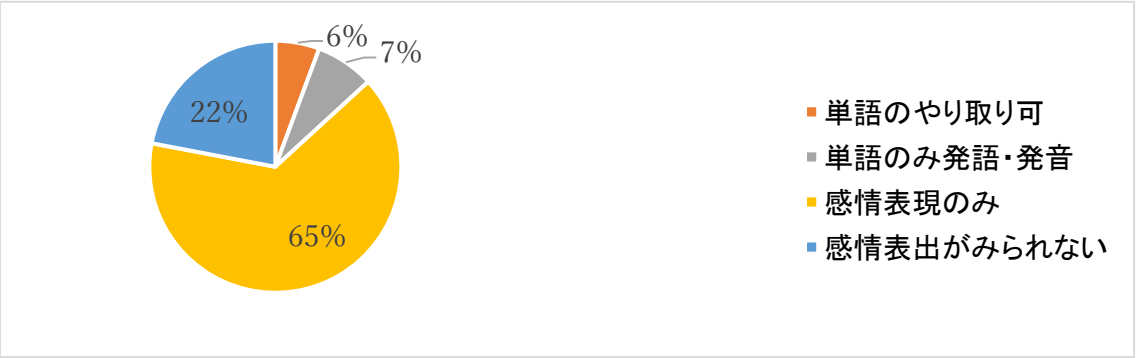
Under 10 years old
aged 10-17
aged 18-29
aged 30-39
aged 40-49
aged 50-59
aged 60-69
aged 70 or older

●Motor functions



Requires walking assistance
, can maintain sitting position (with backrest)
, can maintain sitting position (without backrest)
, can roll over in bed
, unable to move by oneself

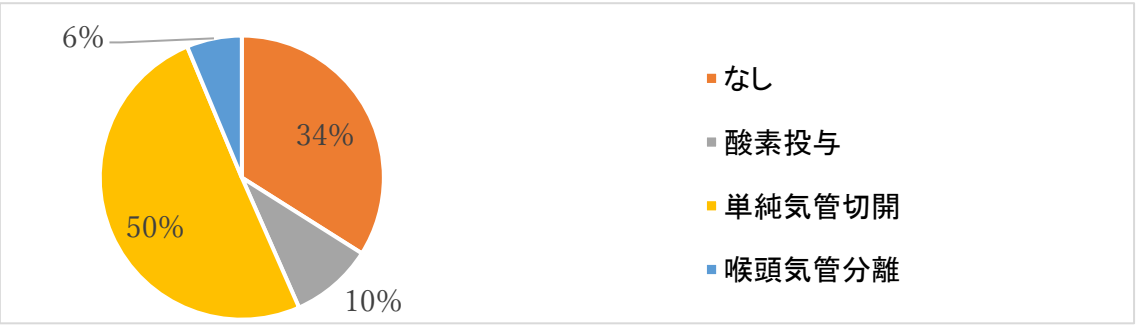
●Communication functions



Can communicate with words (may or maynot be able to string sentences together)
, can only pronouce words
, only able to communicate their emotions (through their expression or vocalisation)
, no emotions are expressed

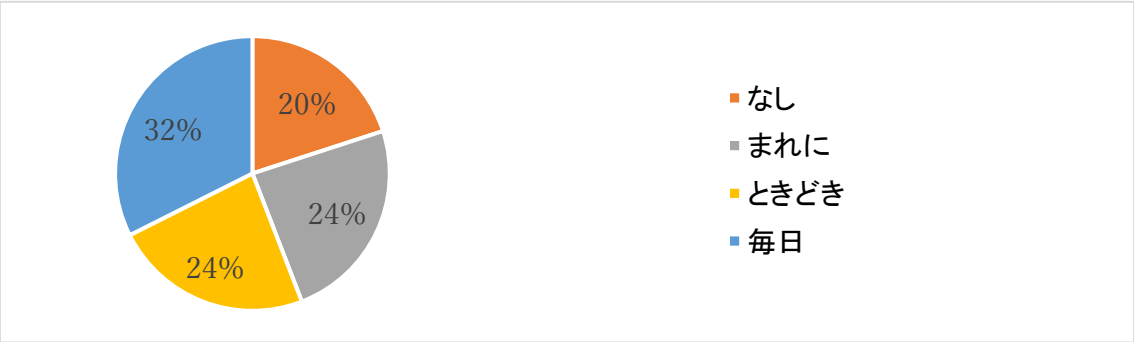
The largest number of patients had had the onset at age “18 to 29 years old.” The results of (2) Motor functions consisted of 2% “assisted walking,” 34% “sitting position,” 7% “capable of turning over in bed,” and 57% “difficulty in moving by oneself,” and the results of (3) Communication functions consisted of 6% “capable of exchanging words,” 7% “speech only with single words,” 65% “emotional expression only,” and 22% “no emotional expression.”

●Respiratory management



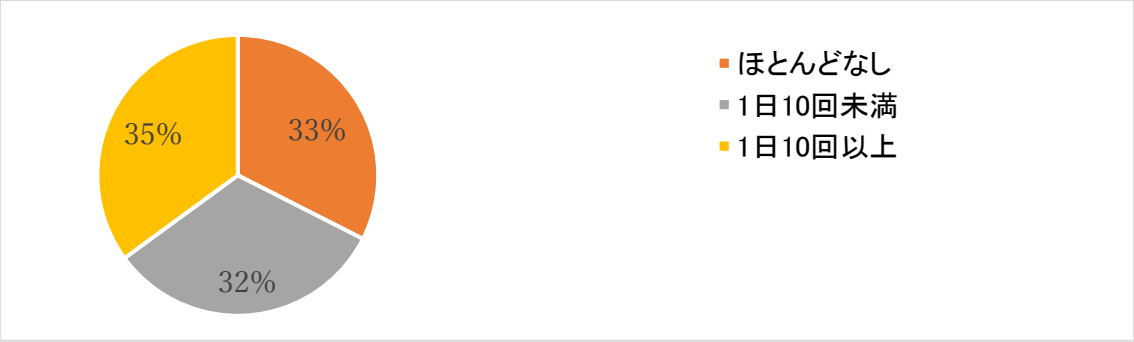
None
, supplemental oxygen
, tracheotomy
, Laryngotracheal separation (LTS)

●Sialorrhea



None
, rare
, some times
, every day

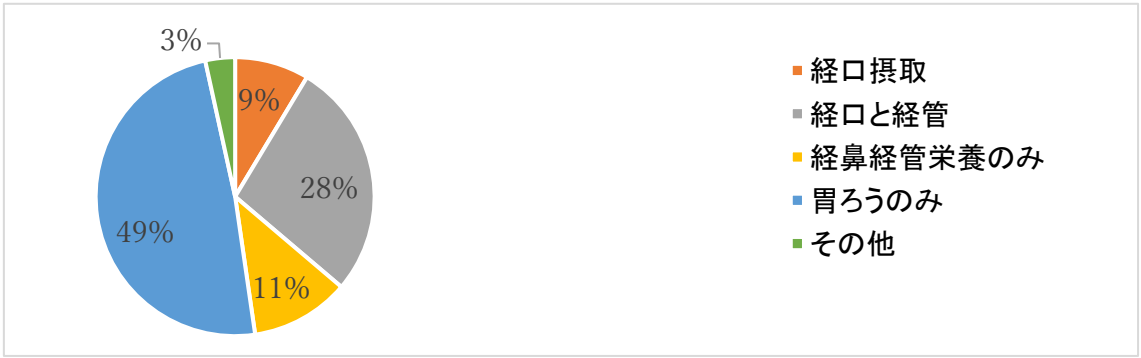
●Suction



Almost never
, under 10 times a day
, 10 or more times a day

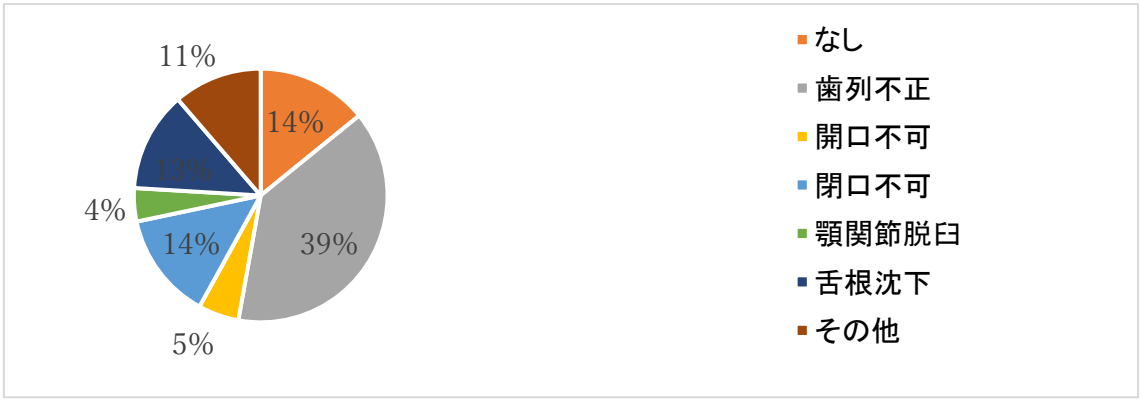
(4) State of respiratory management consisted of 34% “none,” 10% “oxygen administration,” 50% “tracheostomy,” and 6% “tracheoesophageal diversion.” For (5), sialorrhea consisted of 20% “none,” 24% “on rare occasions,” 24% “sometimes,” 32% “every day,” and suction was done 33% “almost never,” 32% “less than 10 times a day,” and 35% “10 times or more often.”

●Food intake



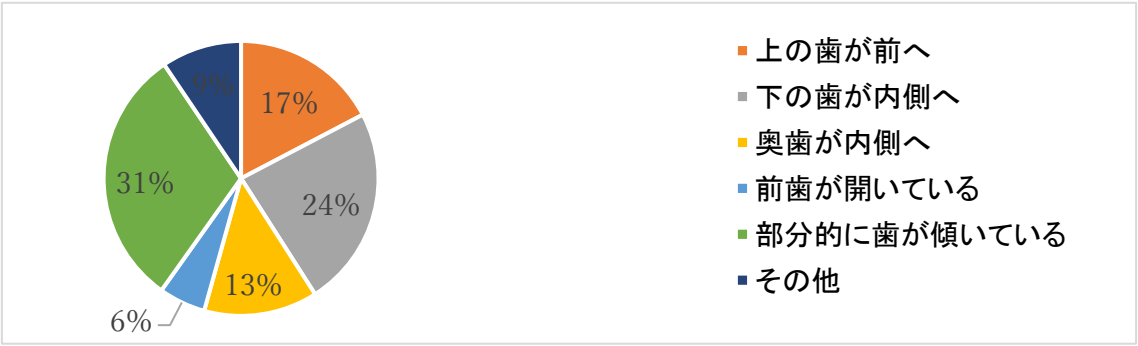
Oral intake
, fed both orally and through a tube
, tube fed (nasogastric tube)
, tube fed (gastrostomy)
, other

●Dental and oral issues



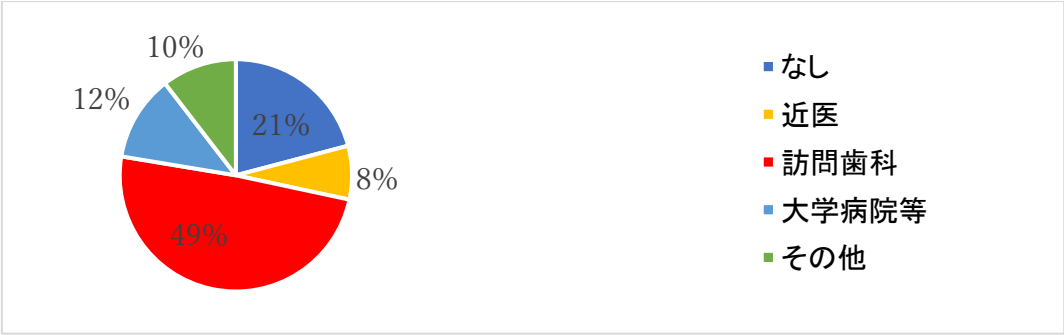
None
, malocclusion
, unable to open mouth
, unable to close mouth
, temporomandibular joint dislocation
, glossoptosis
, other

●Details about malalignment



Upper teeth has moved forward
, lower teeth has moved inward
, molars has moved inwards
, space between front teeth
, partially inclined teeth
, other

●Regular dentist

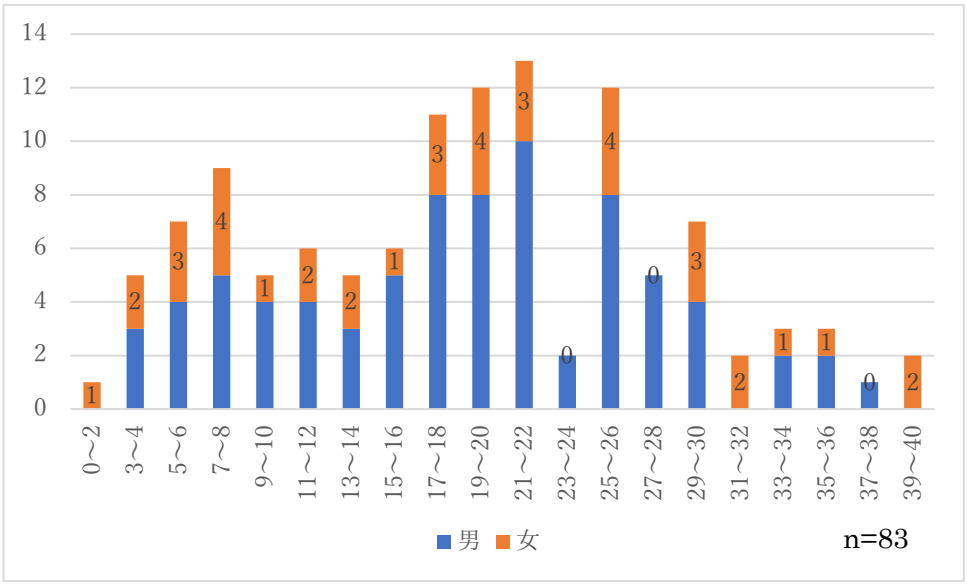


None
, General Practitioner (local doctor)
, dentist providing home visiting care
, larger institutions such as a university hospital
, other

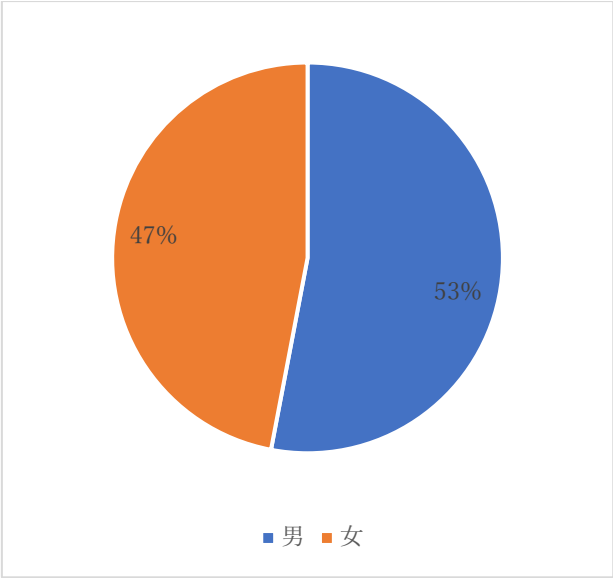
(6) State of food intake consisted of 9% “oral intake only,” 28% “oral and tube,” 11% “nasogastric tube feeding only,” and 49% “gastric fistula only.” (7) Dental and oral issues including teeth alignment consisted of 14% “none,” 39% “malalignment,” 5% “incapable of opening the mouth,” 14% “incapable of closing the mouth,” 4% “jaw dislocation,” and 13% “glossoptosis.” The results of (8) Whether there was a dentist they saw regularly said 21% had “none,” and the breakdown of positive answers

consisted of 8% “a nearby dentist,” 49% “visiting dentist,” and 12% “university hospital, etc.” Whether there was regular consultation resulted in 12% “no” and 88% “yes.”

The number of questionnaires returned from the Japanese National Network of Xeroderma Pigmentosum (XP) was 83.



Male /Female



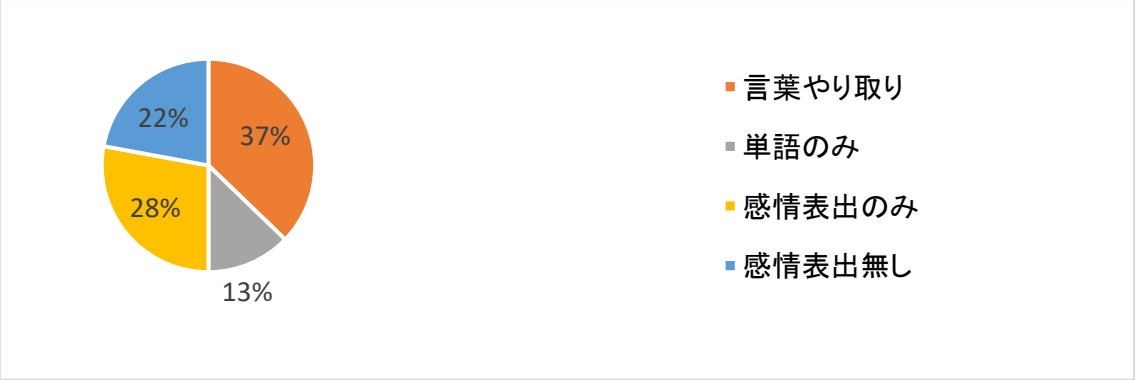
Male /Female

The average age of the subject patients was 19.4 years old (2 to 40 years old, median value: 20 years old), and the male to female ratio was roughly 1:1.

●Motor functions

Can walk without assistance
, requires walking assistance
, can maintain sitting position (without backrest)
, can maintain sitting position (with backrest)
, can roll over in bed
, unable to move by oneself
, able to crawl

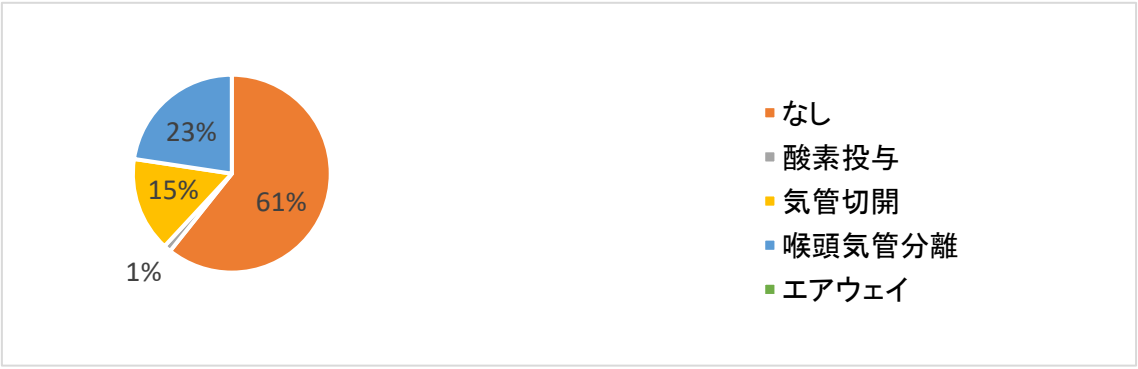
●Communication functions



Capable of exchanging words
, speech only with single words
, emotional expression only
, no emotional expression

The results of (2) Motor functions consisted of 23% “walking without assistance,” 12% “assisted walking,” 19% “sitting position,” 9% “capable of turning over in bed,” 31% “difficulty in moving by oneself,” and 6% “crawling with the belly against the floor.” The results of (3) Communication functions consisted of 37% “capable of exchanging words,” 13% “speech only with single words,” 28% “emotional expression only,” and 22% “no emotional expression.”

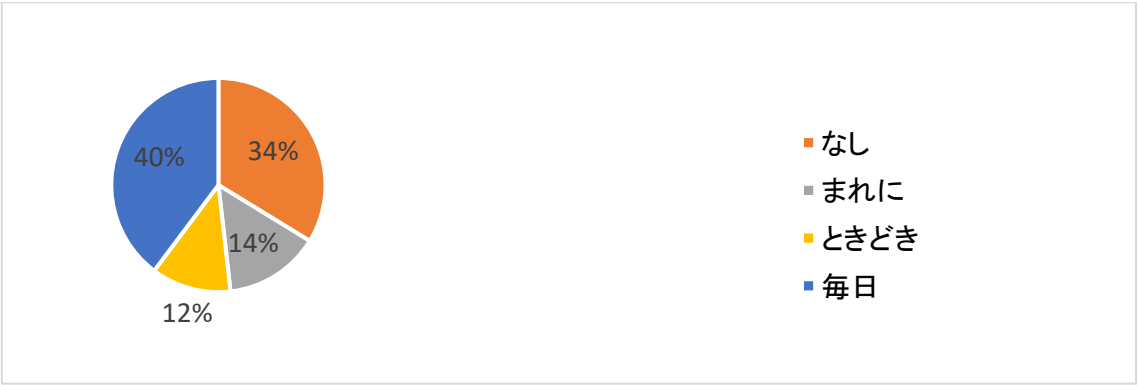
●Respiratory management



None
, oxygen administration
, tracheostomy
, tracheoesophageal diversion,
, airway (using airway devices i.e. laryngeal mask airway, esophageal obturator airway)

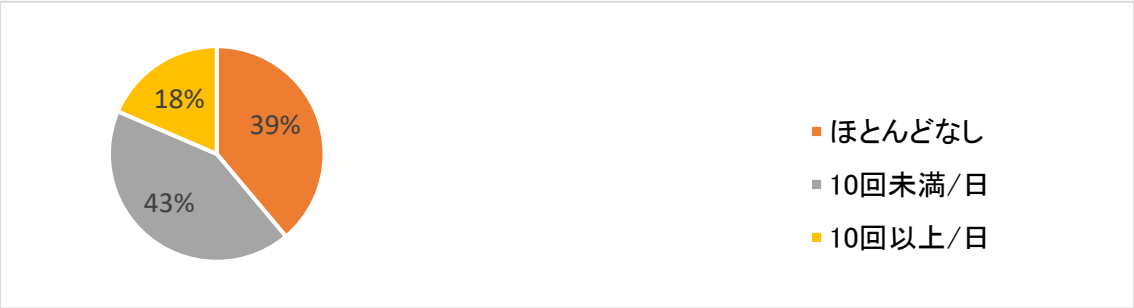
(4) State of respiratory management consisted of 61% “none,” 1% “oxygen administration,” 15% “tracheostomy,” 23% “tracheoesophageal diversion,” and none with “airway.”

●Sialorrhea



None
, rare
, some times
, every day

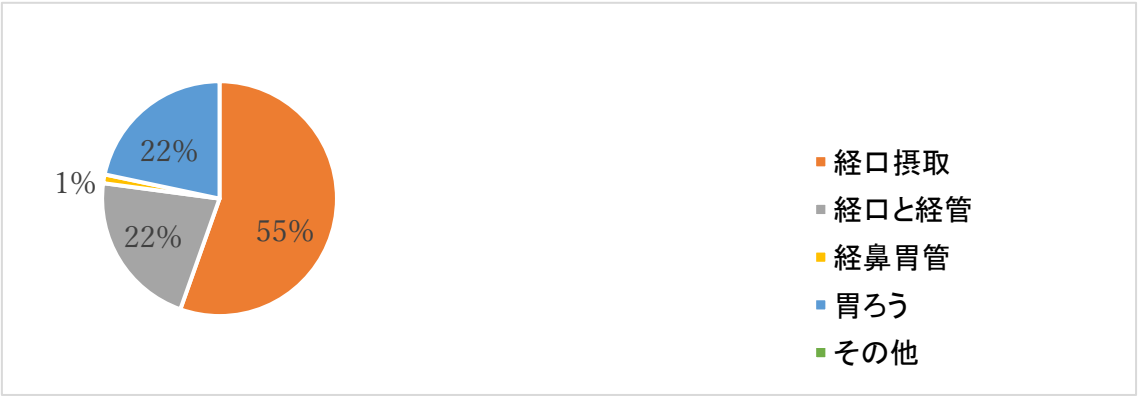
●Suction



Almost never
, less than 10 times a day
, 10 times or more often

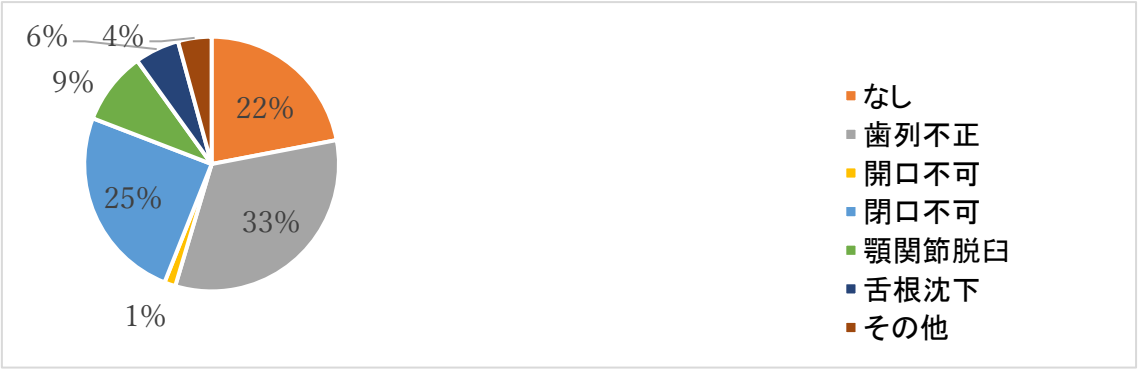
For (5), sialorrhea consisted of 34% “none,” 14% “on rare occasions,” 12% “sometimes,” 40% “every day,” and suction was done 39% “almost never,” 43% “less than 10 times a day,” and 18% “10 times or more often.”

●Food intake



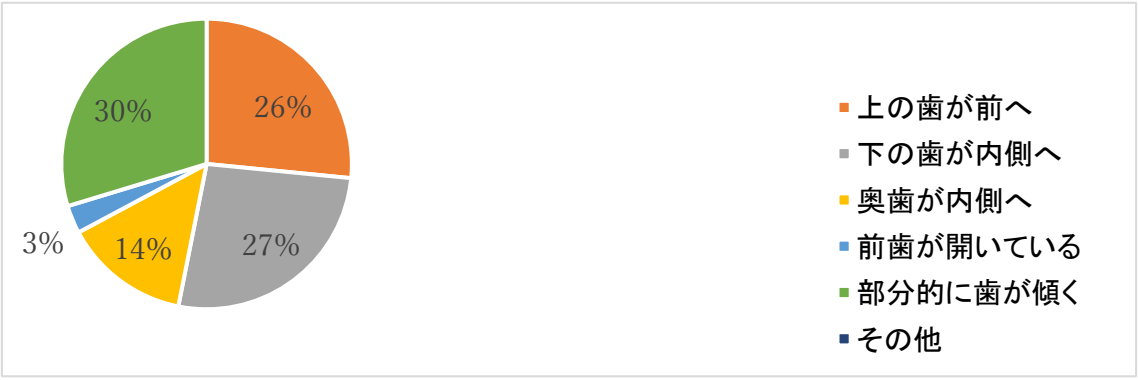
Oral intake only
, oral and tube
, nasogastric tube feeding only
, gastric fistula only
, other

●Dental and oral issues



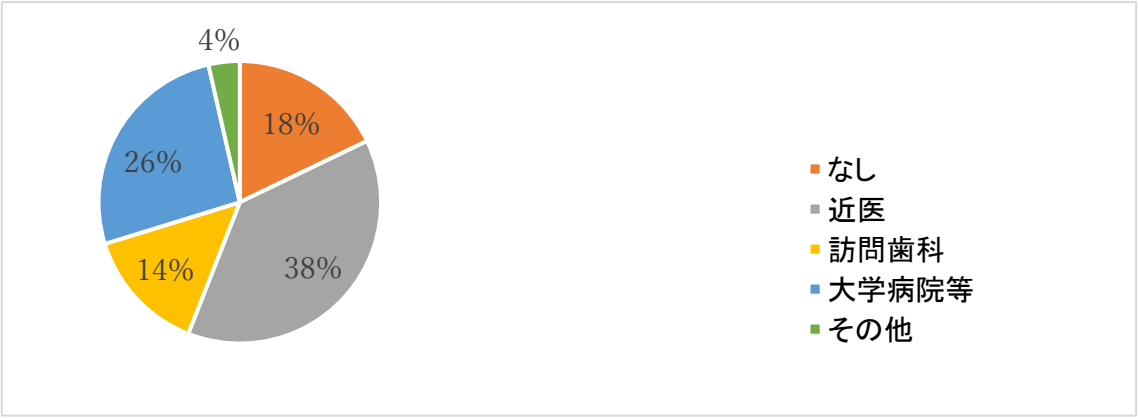
None
, malalignment
, incapable of opening the mouth
, incapable of closing the mouth
, jaw dislocation
, glossoptosis.

●Details about malalignment



Upper teeth has moved forward
, lower teeth has moved inward
, molars has moved inwards
, space between front teeth
, partially inclined teeth
, other

●Regular dentist



None
, a nearby dentist
, visiting dentist
, university hospital
, etc.

●Regular consultation

No

, yes

(6) State of food intake consisted of 55% “oral intake only,” 22% “oral and tube,” 1% “nasogastric tube feeding only,” and 22% “gastric fistula only.” The rate of the patients who only had oral intake was higher than that of the patients in persistent vegetative state. (7) Dental and oral issues including teeth alignment consisted of 22% “none,” 33% “malalignment,” 1% “incapable of opening the mouth,” 25% “incapable of closing the mouth,” 9% “jaw dislocation,” and 6% “glossoptosis.” The results of (8) Whether there was a dentist they saw regularly said 18% had “none,” and the breakdown of positive answers consisted of 38% “a nearby dentist,” 14% “visiting dentist,” and 26% “university hospital, etc.” The rate of nearby dentists was higher in this group. Whether there was regular consultation resulted in 18% “no” and 82% “yes.”

While it is assumed that oral care, general dental diagnosis and treatment, and measures against eating disorder/dysphagia are recently increasing in principle in visiting dental care, the actual state of measures in dental and oral issues such as teeth alignment in patients of severe eating disorder/dysphagia had not been elucidated. This study revealed the situation of intervention by visiting dentists for patients of severe eating disorder/dysphagia, and showed that approximately 20% had no regular dentists. It indicated the possibility that oral issues such as malalignment may depend on the number of years elapsed since onset, oral cavity functions such as sialorrhea and presence of oral intake, and that they are related to systemic motion functions, communication functions, respiratory functions and so forth. It was also indicated that the importance of preventive intervention is high in problems of teeth alignment and so forth, not just the measures after the occurrence of malalignment. It will be necessary in the future to intervene along with the measures to facilitate the oral cavity functions as well as eating and swallowing functions.

It has been claimed since before that oral care plays an important role in visiting dental care in addition to the general dental diagnosis and treatment, and popularization of the measures against eating disorder/dysphagia has advanced considerably in the recent years. It was surmised that the viewpoint of malalignment prevention was also important, and that it needed to be added to this manual.

●Chapter 11: Information and communication technology (ICT)

[Chapter 11: Treatment of eating disorder/dysphagia using information and communications technology (ICT)]

Remote diagnosis and treatment with application of information and communications technology (hereinafter referred to as ICT) is being promoted in the medical field. So far, remote radiographic diagnosis and so forth have been implemented in order to efficiently provide the medical services of diagnostic radiologists, who are considered shorthanded. In visiting care, introduction of online diagnosis with application of ICT has been promoted for home care management and so forth in order to compliment the face-to-face diagnosis by doctors and so forth. At present, health insurance calculation has become possible for some cases, as long as the facility standards are satisfied.

Almost no remote diagnosis and treatment have been provided in dentistry using ICT. However, the field of feeding/swallowing rehabilitation (hereinafter referred to as swallowing rehabilitation) has a high affinity, and the Department of Dysphagia Rehabilitation, Tokyo Medical and Dental University Dental Hospital has been conducting a trial measure to give advice and instructions on swallowing rehabilitation by connecting with dentists in remote regions through ICT, and has felt that it could be useful. Since there are very few reports in this field, this document will present the parts related to the basic Q&A on ICT below instead of matching the style of other parts of this document, and show the scenes from our actual attempts and voices of the related interprofessional collaboration members at the end. The questions we selected here are described as follows:

Q11-1: What is ICT diagnosis and treatment? And what types of treatments are there?

Q11-2: It is said that insurance is partially introduced in the medical field. What diagnosis and treatment actions are approved?

Q11-3: What advantages and disadvantages are there when using ICT diagnosis and treatment in treatment of dysphagia?

Q11-4: In the future, what will be possible by applying ICT diagnosis and treatment in swallowing rehabilitation?

Q11-5: Personal information will be transmitted when using ICT, but will the safety of information be maintained?

Q11-6: How much time does it require to conduct feeding/swallowing rehabilitation using ICT?

Q11-1. What is ICT diagnosis and treatment? And what types of treatments are there?

Answer: ICT refers to a remote diagnosis which utilizes the information and communications technology. While it may not sound familiar as dental care consists mostly of actual treatments, it has been discussed extensively in the medical field in recent years. It can supplement the consultation and diagnosis by diagnostic radiologists and diagnostic pathologists who tend to be short in remote areas in particular.
ICT treatments are classified as follows:

Type	Description
D to D	The specialist and the general physician are connected by remote diagnosis.
D to D &P)	The specialist, the general physician and the patient are connected by remote diagnosis.
D to P	The specialist and the patient are connected by remote diagnosis.
D to N	The specialist and the nurse are connected by remote diagnosis.
N to P	The nurse and the patient are connected by remote diagnosis.
D to N & P	The specialist, the nurse and the patient are connected by remote diagnosis.

D：Doctor, P：Patient, N：Nurse

While it is desired that nutritionist and rehabilitation specialists such as speech-language-hearing therapists should also be incorporated in this system in the future, the forms that are mainly being discussed as being widely possible in Japan at present are D to D & P and D to P. As the method of description, the specialist can be designated as D1 and the physician in the remote area D2, and it would be easier to understand if we designate the D to D & P form, for example, as D to D and P when the main party of diagnosis is D2, and D to P and D when the main party is P. Furthermore, the ICT form we implemented was D to D and P.

Q11-2. It is said that insurance is partially introduced in the medical field. What diagnosis and treatment actions are approved?

Answer: Online care was started in the medical field since FY 2018. Most of it is either remote image diagnosis or telepathology in terms of billing under insurance coverage at present. They correspond to a diagnostic radiologist or diagnostic pathologist receiving the radiograph or sample from the remote area and providing advice in diagnosis, instructions and so forth. As case examples of advanced measures, some areas utilize ICT as a tool for coordination between medical care and nursing care for home care patients and so forth. Parts of them have been covered under insurance for the purpose of supplementing the face-to-face care by visiting physicians, such as management of home oxygen therapy, in-home management of asthma patients and in-home management of chronic heart failure patients.

Q11-3. What advantages and disadvantages are there when using ICT diagnosis and treatment in treatment of dysphagia?

Answer: It is becoming socially recognized that dentists are in an important position to be responsible for diagnosis and treatment of eating disorder/dysphagia and swallowing rehabilitation at home and facilities. However, it cannot be said that the number of dentists who are familiar with swallowing rehabilitation is sufficient, as described previously, and it does not mean that they are active in every area of the country. Since visiting care by general dentists is relatively more complete in the meantime, online connection between a visiting dentist and a specialized dentist in eating and swallowing through ICT is expected to lead to popularization of more specialized dysphagia treatment in wider areas through the country.

It is not always necessary for the dentist to see the patient face-to-face in diagnosis and treatment of eating disorder/dysphagia, and it largely depends on information such as the history of pneumonia, aspiration and so forth in the past, status of medication, and complexion, expressions and so forth of the patient. It would be well worth complementing face-to-face consultation with online conversation and vivid images through application of ICT. The general dentists will benefit from the fact that they can provide care while receiving advice and instructions from a specialist, and the patients will benefit from being able to receive sufficient evaluation and

instructions as well as appropriate measures such as swallowing rehabilitation even in a remote location. The specialist can save the time necessary for transportation. A possible disadvantage is that immediate measures may be difficult, as people in multiple occupations need to adjust their time in advance, but the burden for each should still be reduced compared to actually making time and appointments for visiting care. Other disadvantages include that this method is not available in areas where there is no Internet environment, and that insurance will not cover the fees of the instructing specialist under the current circumstances.

Q11-4. In the future, what will be possible by applying ICT diagnosis and treatment in swallowing rehabilitation?

Answer: It will become possible for a visiting dentist who is not familiar with swallowing rehabilitation to provide care while sharing knowledge and discussing with another dentist with specialized knowledge through ICT connection. Furthermore, if these measures become more mature, it may be possible to extend the connection to other professionals such as visiting nurses, visiting pharmacists, nutritionists, physical therapists, speech-language-hearing therapists, and occupational therapists. In addition, meal rounds, which were introduced in the previous revision of the long-term care insurance system to be conducted in facilities and so forth, can help make online observation of the residents in actual meals, and it has the potential for various professionals to have discussions without gathering at the facility.

Q11-5. Personal information will be transmitted when using ICT, but will the safety of information be maintained?

Answer: At present, the D to D & P form is being assumed for the care of eating disorder/dysphagia with application of ICT. The information to be input online will therefore be the name and mobile phone number of the visiting doctor or dentist but not the patient information, and it will be the mobile phone of the visiting doctor or dentist that will connect with the specialist. In addition, an online chart system for which security was ensured was also adopted for video communication. However, we can assume that there will be various different cases in the future, and it is necessary

that we continue further examination regarding security improvement in the future to ensure the safety of patient information.

Q11-6. How much time does it require to conduct feeding/swallowing rehabilitation using ICT?

Answer: The care using ICT will not vary much from the normal care of eating disorder/dysphagia. It will start with an interview and end with instructions on eating posture, method of assistance, diet type, rehabilitation method and so forth, and is estimated to take approximately 30 minutes.

[Case example report]

Diagnosis and treatment have so far been provided in Tohoku, Chubu and Kansai regions for the following cases. Since it is provided by connecting the Department of Dysphagia Rehabilitation, Tokyo Medical and Dental University and a local dental clinic using YaDoc (Integrity Healthcare Co., Ltd.), which is an online care system, the adopted form was D to D & P.

	Gender	**Age**	**Primary disease**	**Request**	**Instructions**	**Time**	**Residence status**	**ICT form**
A	Male	48	Cerebral hemorrhage	Swallowing rehabilitation and diet type	Determination of food properties and advice on rehabilitation method	Approx. 30 minutes	Home	D to D and P
B	Male	68	Aspiration pneumonia	Swallowing rehabilitation and method of eating assistance	Advice on methods of eating assistance and rehabilitation method	Approx. 30 minutes	Home	D to D and P
C	Male	73	Ossification of posterior	Swallowing rehabilitation and	Advice on rehabilitation	Approx. 30	Home	D to D and P

			longitudinal ligament	nutrition intake	method and diet type	minutes		
D	Female	82	Dementia	Diet type and method of eating assistance	Advice on posture and method of eating assistance	Approx. 20 minutes	Facility	D to D and P
E	Female	86	Dementia	Diet type and method of eating assistance	Advice on posture and method of eating assistance	Approx. 20 minutes	Facility	D to D and P

[Summary]

It was possible to provide favorable medical services to the patients of dysphagia, which is considered difficult for dentists practicing in rural areas to treat in general, while mitigating the psychological concerns of the practicing dentists. It also allowed the dentists specialized in dysphagia to approach potential patients in rural areas, and to provide more direct instructions than exchanges in paper medium.

While the possible limitations include line connection errors, image clarity, insufficiency in the billing system under health insurance, and the issues of information safety in ICT, we consider that it is a topic that should be discussed actively as a method for effective utilization of the limited medical resources.

Some of the impressions after using ICT are introduced below as voices from the field:

- O (dentist): “I gained some good experience having a chance to observe diagnosis and treatment which I normally cannot consult about, through remote bilateral exchanges with video. Indications and instructions from a different standpoint also really helped.”
- S (dental hygienist): “It was nice to be given instructions on specific methods by having a specialist see the conditions of the patient in real time with video.”
- T (occupational therapist): “It helped me learn as I was given instructions on a method to reduce the risks of aspiration from eating.”
- S (nutritionist): “I spent a meaningful time being given the opportunity to learn about the knowledge on palatal augmentation prosthesis and so forth.”

While there are favorable opinions as shown above, some voiced an opinion to question the care and meal observation by multiple people. However, we would like to make it mature through trials, as utilization of ICT in dentistry has only begun.

●Chapter 12: Reality of visiting dental care at university hospitals and preliminary survey on the state of recurrent education

[Chapter 12: Reality of visiting dental care at university hospitals and preliminary survey on the state of recurrent education]

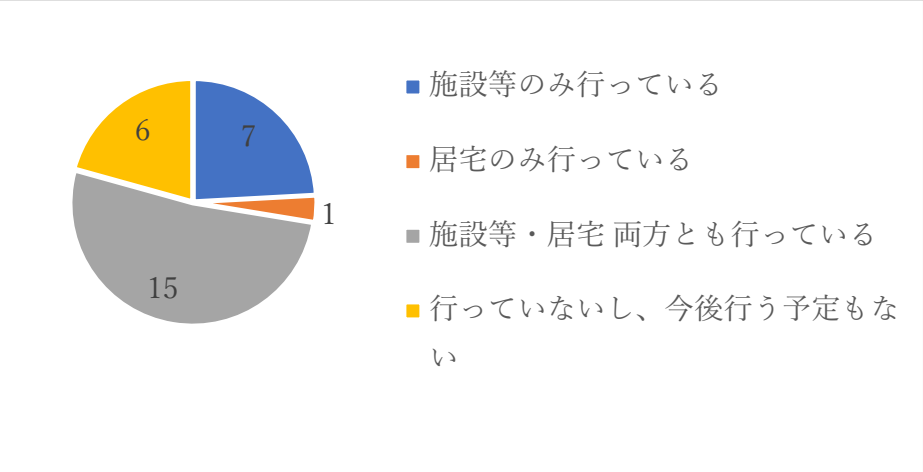
While visiting dental care is one of the important needs in dentistry care in the super aging society, training of dentists who can provide this is essential and enhancement of education before and after graduation is considered important. We therefore conducted a questionnaire survey on the actual status of visiting dental care and its education in university hospitals with full cooperation from the Japanese Society of Gerodontology, with the purpose of further developing the education on visiting dental care.

To grasp the degree of actual education on visiting dentistry, we conducted a survey on all 29 dental universities. The survey studied whether the university provided visiting dental care, education on visiting dental care before graduation, education of medical interns, and acceptance and details about education after graduation (recurrent education).

The questionnaire form was prepared with cooperation from the Japanese Society of Gerodontology, and survey was conducted on the web from the end of October to the end of November 2018. There was no need for an ethical review as there was no collection of patient data and so forth.

1. Survey on clinical status and educational status of visiting dentistry at university hospitals

Question 1: Do you provide visiting care as a university hospital?

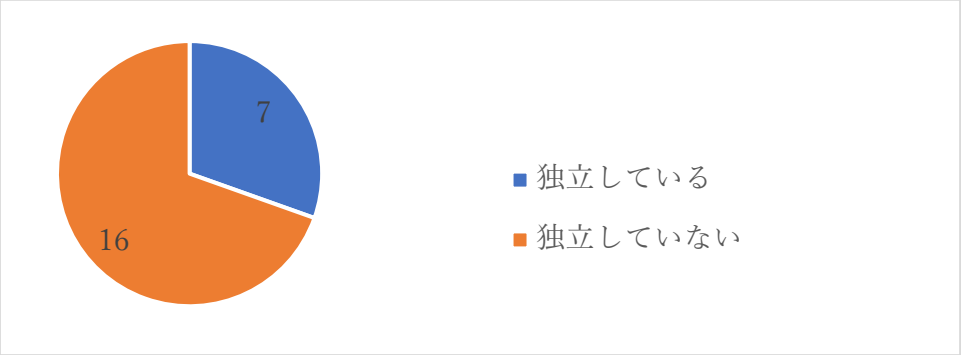


Only provide visiting care at facilities (such as nursing homes for the elderly)
, only provide home visiting care
, provide visiting care at both facilities and home
, does not provide visiting care and there are no plans to do so

●What is the reason for not providing visiting dental care?

・ Because we are an advanced treatment hospital (3 hospitals)
・ Due to the relationship with the dental association
・Various circumstances. Understanding of the concerned people is not obtained
・No opportunity to establish a system to do so

Question 1-1: Is visiting dental care independent as a clinical department (to 23 universities conducting visiting dental care)?



Is independent

, not independent

●What is the name of the independent clinical department at the university?

Name of university	Name of clinical department
Ohu University	Community Medicine Support Dentistry Dept.
Asahi University	Dentistry Dept. for the Disabled, Asahi University Medical & Dental Center
Niigata University	Dysphagia Rehabilitation Dept.
Health Sciences University of Hokkaido	Visiting Care Office, Community Support Medicine Dept.
School of Dental Medicine, Tsurumi University	Dept. of Geriatric Dentistry, Dept. of Oral Medicine
Tokushima University	General Dentistry
Tohoku University	Geriatric Dentistry Dept.
School of Dentistry at Matsudo, Nihon University	Division of Special Needs Dentistry, Division of Medical Cooperation
Gerodontology, Tokyo Medical and Dental University	Dept. of Dysphagia Rehabilitation
Tokyo Dental College	Dept. of Dysphagia Rehabilitation, Dept. of Special Needs Dentistry, Dept. of Oral Surgery
Nagasaki University	Dysphagia Rehabilitation Center
Aichi Gakuin University	Prosthetics Dept. (total loss repair)
Osaka Dental University	Dept. of Geriatric Dentistry
Kyushu Dental University	Dept. of Geriatric Dentistry and Oral Rehabilitation

School of Dentistry, Showa University	Dept. of Geriatric Dentistry, Dept. of Oral Rehabilitation
The Nippon Dental University Niigata Hospital	Oral Care Dept., Visiting Dentistry
Fukuoka Dental College	Visiting Dentistry Center
Matsumoto Dental University	Cooperative Oral Care Dept.
Hiroshima University	Dept. of Prosthetic Dentistry, Regional Support Dental Clinic Division
Kanagawa Dental University	Department of Medically Compromised Geriatric Dentistry
Iwate Medical University	Oral Rehabilitation Clinic
School of Life Dentistry at Tokyo, The Nippon Dental University	Oral Rehabilitation Dept.
School of Dentistry, Nihon University	Dysphagia Rehabilitation Dept.

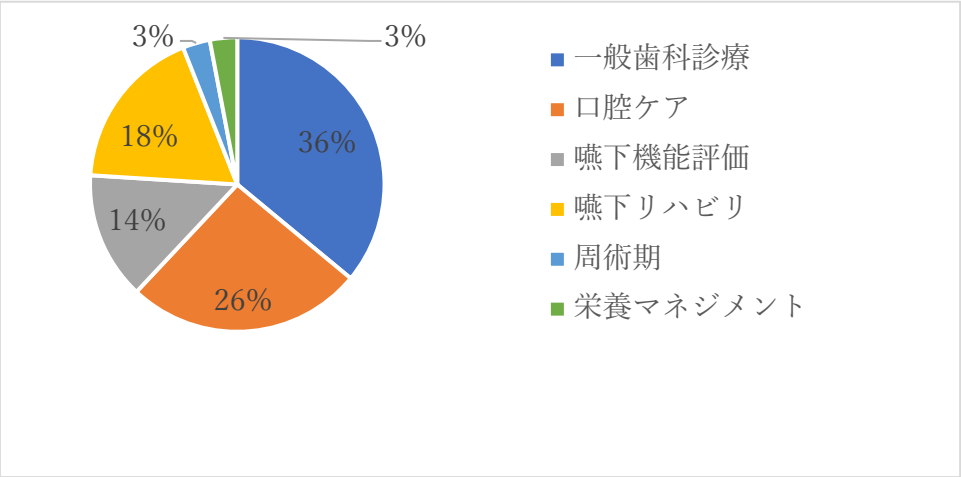
Question 1-2: What is the number of staff members on the payroll who serve in visiting dental care operations?

Full time/part time	Name of occupation	Median value for the number of staff members (range)
Full time	Dentist	4 (0-12)
Full time	Dental hygienist	1 (0-8)
Full time	Speech-language-hearing therapist, nutritionist	0 (0-4)
Part time	Dentist	4 (0-12)
Part time	Dental hygienist	3 (0-12)
Part time	Nutritionist, nurse	0 (0-1)

Question 1-3: What are the destinations of visits and the number of patients visited?

Destination	Median value for the number of patients (range)
Facility	70 patients/month (1-310)
Home	15 patients/month (0-300)
Hospital	18 patients/month (0-80)

●What are the detailed items of care?



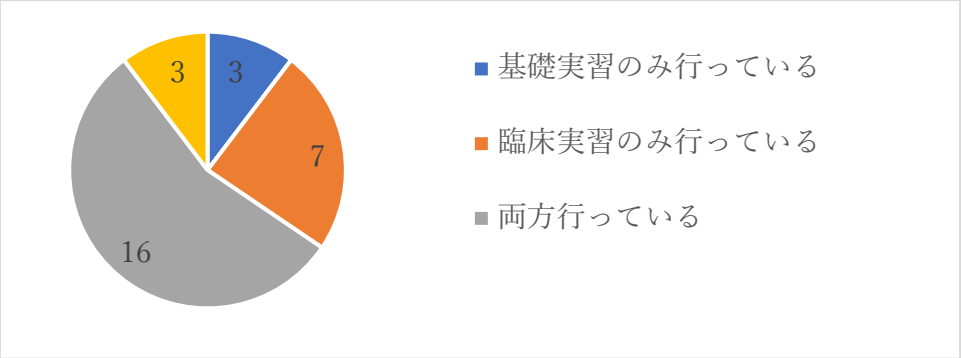
General dentistry (dental treatments)
, professional oral hygiene
, evaluation of swallowing function
, dysphagia rehabilitation
, pre and post-operative care
, dietary management

Question 1-4: How many dental unit-incorporated type visiting dental care vehicles does the university own?

Owns vehicle
, used to own vehicle but disposed of it
, does not own

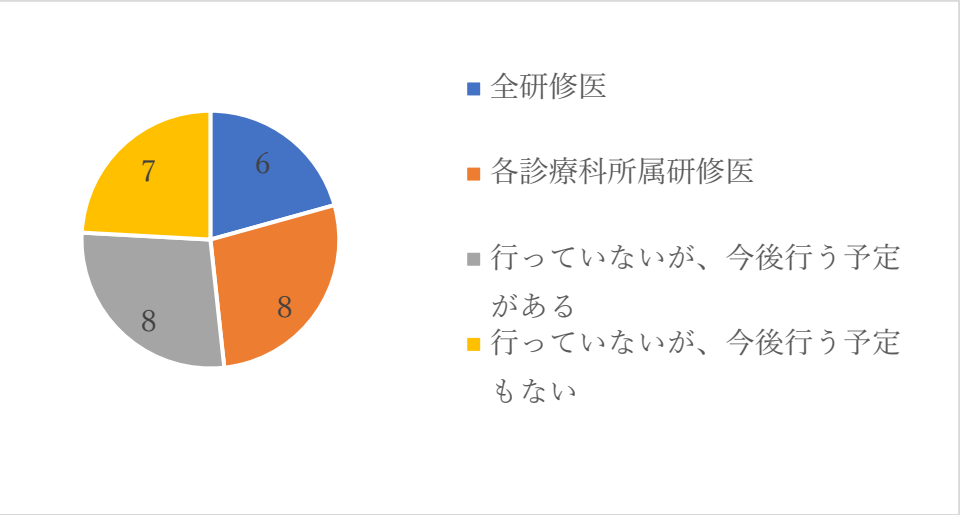
2. Survey on the status of recurrent education on visiting dentistry at university hospitals

Question 2: Do you provide practical training on visiting dental care as part of education before graduation?



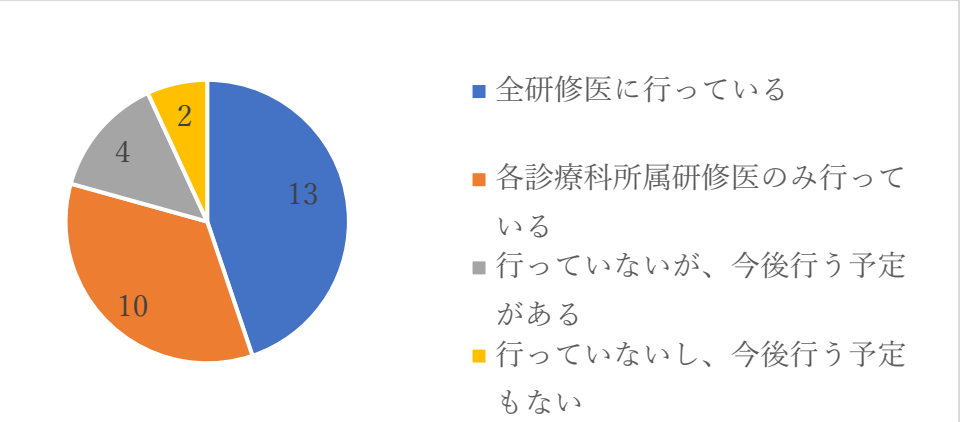
Provided only during basic practical training
,provided only during clinical training
,provided both during basic practical training and clinical training

Question 3: Do you provide it as basic practical training for dental interns?



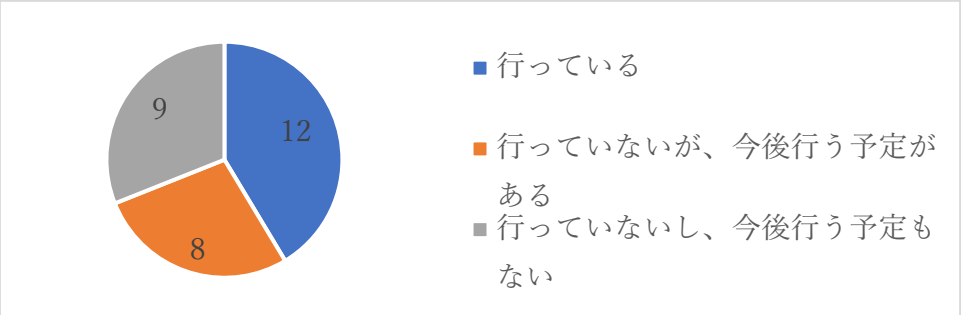
All interns undergo training
, only the interns stationed at certain departments undergo training
, training is not provided to interns but there are plans to do so
, training is not provided to interns and there are no plans to do so

Question 3-1: Do you provide it as clinical training for dental interns?



All interns undergo training
, only the interns stationed at certain departments undergo training
, training is not provided to interns but there are plans to do so
, training is not provided to interns and there are no plans to do so

Question 4: Do you provide training and so forth on visiting dental care to people outside the university as recurrent education?



Programs are provided
, not provided but there are plans to do so in the future
, not provided and there are no plans to provide such programs

Question 4-1: What does the training consist of?

Observation only
, includees all aspects of providing treatment
, other

Question 4-2: How often is the training provided (during the training period)?

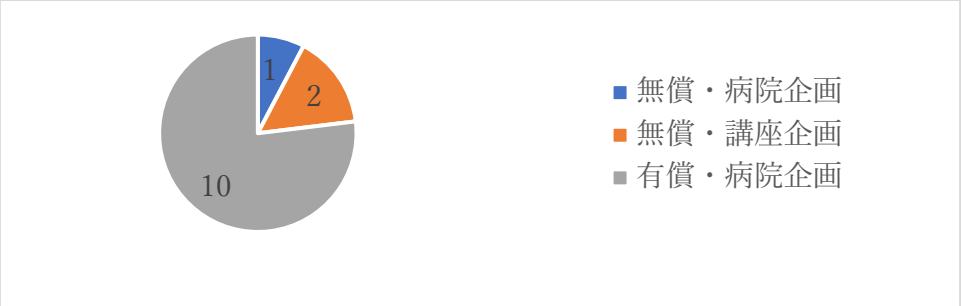
Irregular
, regularly (once a week)
, regularly (other)

Question 4-3: Can the training period be extended?

Yes

, No

Question 4-4: What are the expenses?

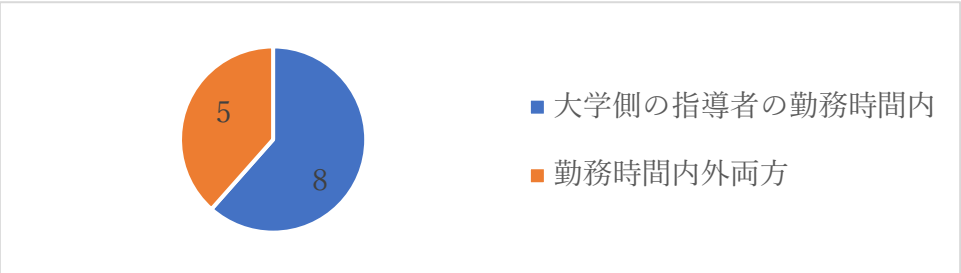


Not paid(no particular budget)/planned by hospital

,not paid/planned by the department

,paid(endorced)/planned by hospital

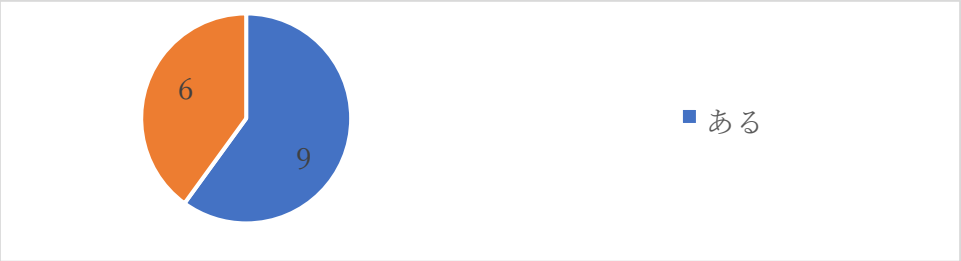
Question 4-5: What is the time zone for implementing training?



Within the working hours of university staff members

,both within and outside of working hours

Question 4-6: Is there a restriction on the occupations that are accepted?



Yes (There are restrictions)

Question 4-7: What kind of training do you provide?

Provided through the internship program only

●Universities which conduct training on visiting dental care and so forth as recurrent education (after graduation)

Name of University	Name of social status	Description of training
Health Sciences University of Hokkaido	Type 2 clinical training assistant	Diagnosis and treatment actions in general
School of Dental Medicine, Tsurumi University	Special clinical course student	Others
Tokyo Medical and Dental University	Graduate school research students	Diagnosis and treatment actions in general
	Registered medical practitioner interns	Observation only

	Dental Hygienist Professional Development Center reinstatement support/departure prevention promotion project, training program for team medicine leaders in oral functions and hygiene management of perioperative patients	Observation only
Okayama University	Registered medical practitioner interns	Diagnosis and treatment actions in general
Tokyo Dental College	Special courses in clinical practice	Diagnosis and treatment actions in general
Nagasaki University	Registered medical practitioner interns	Diagnosis and treatment actions in general
Kyushu Dental University	Registered medical practitioner interns	Diagnosis and treatment actions in general
	Medical interns, registered dental hygienists	Diagnosis and treatment actions in general
School of Dentistry, Showa University	Graduate school research students	Diagnosis and treatment actions in general
	Research students	Diagnosis and treatment actions in general
School of Life Dentistry at Niigata, the Nippon Dental University	Students auditing clinical courses, registered dentist interns	Observation only
	Registered dentist interns	Diagnosis and treatment actions in general

Matsumoto Dental University	-	Diagnosis and treatment actions in general
Kanagawa Dental University	Students majoring in the course	Diagnosis and treatment actions in general
School of Life Dentistry at Tokyo, The Nippon Dental University	Residents	Diagnosis and treatment actions in general
School of Dentistry, Nihon University	Research students	Diagnosis and treatment actions in general

* Survey period: Oct. to Nov. 2018

* Survey was conducted on 29 universities with dentistry departments.

[Summary]

While 80% of the universities provided visiting dental care, many of them were only visiting facilities. 90% of them provided basic practical training as part of education before graduation, with the period varying widely among universities from 15 minutes to 1190 minutes. Only 30% provided practical training on visiting dental care, and many of the destinations in practical training were facilities, with few opportunities of education at home and so forth. 40% provided basic practical training on medical interns, and 80% clinical practical training. University hospitals which did not provide visiting care did not offer opportunities of education in visiting care for medical interns. Only 40% of the universities provided other recurrent education, and it was assumed necessary to enhance the education after graduation in the future in concurrence with the increase in social needs.

As the needs for visiting dental care increase in the super aging society, it is important that dentists who can provide it are trained. Not only education before graduation but also one after graduation will be important, and it is necessary that the education in visiting dental care should be more advanced while including actual homes of patients in addition to facilities as destinations of practical training.