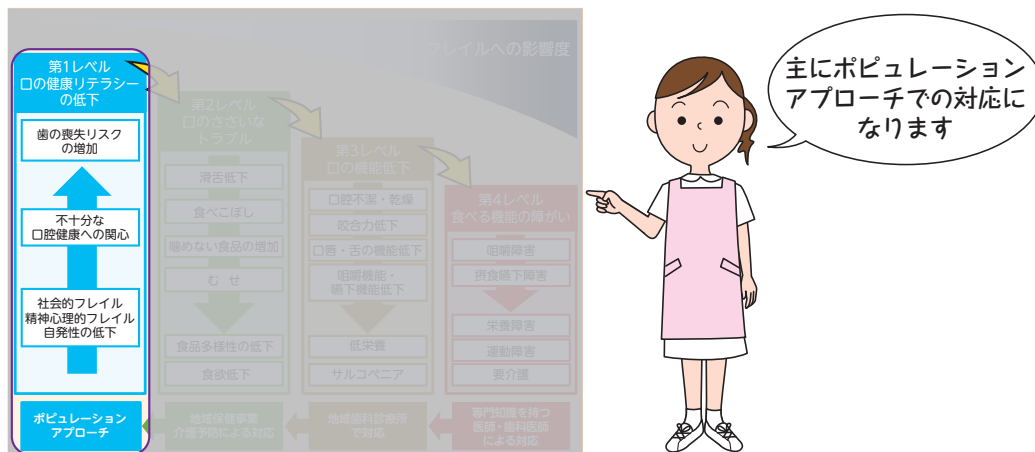


Concept and management of oral frailty

1. Details on oral frailty measures

1) 1st level: Decline in oral health literacy



Outcomes of the “8020 Campaign”

“Level 1” is the stage closest to a healthy condition among the four levels defined by the concept of oral frailty. When we consider the “first level,” it is essential to sufficiently understand the concept of the “8020 Campaign,” which has been promoted by professionals in the dentistry as a national movement. This is because the Japan Dental Association has promoted “oral frailty measures” as a national movement aimed at enhancing the health of Japanese people in addition to the “8020 Campaign.”

The “8020 Campaign” is a nationwide activity in which the Japan Dental Association has been engaged with the Ministry of Health and Welfare (predecessor to the Ministry of Health, Labour and Welfare) since 1989. The Japan Dental Association started the campaign, which was quite a positive movement for the future in an era when the average life span of Japanese men had not yet reached 80, and only a few percent of older adults aged 80 or more had 20 or more teeth which is the target of the “8020 Campaign.” The “8020 Campaign” is aimed at encouraging Japanese people to keep 20 or more of their own teeth until the age of 80, based on the evidence that if we could keep more than 20 of our own teeth, chewing food with a certain degree of toughness is easy and the average life span is also prolonged. However, when the campaign started, only a small percentage of people in their 80s had 20 or more teeth, and even those in their late 50s had fewer than 20 teeth. Given the background, the “8020 Campaign” can be regarded as a quite symbolic campaign because it set an extraordinarily high target and preached to people about the importance of keeping 20 or more of their own teeth even in old age. In the 2016 Survey of Dental Diseases, conducted 27 years after the start of the campaign, the achievement rate reached more than 50%. However, the number continues to increase.

Change in the concept of health promotion

Around 1970, the number of patients suffering from dental caries rapidly increased along with the postwar economic growth, causing a social phenomenon called “Japan is full of patients with dental caries.” Currently, dental clinics are busy with secondary and tertiary preventive dental care. Subsequently, methods for preventing dental caries and periodontal disease have been gradually established. As a result, health promotion has become an essential concept in dental care policies.

Health promotion was proposed at the first international conference in Ottawa, Ontario, Canada, in 1986¹²⁾. With a slogan of “Health for All by 2000,” the Declaration of Alma Ata, adopted in 1978, expressed the need for urgent action to promote primary health care in developing countries. In contrast, the concept of health promotion was developed by focusing on the needs of industrialized countries. “Health promotion” is the process of enabling people to increase their control over and improve their health. The World Health Organization (WHO) constitution states that health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”. To realize the health advocated by the WHO, it is necessary to identify what individuals and groups expect, fulfill their expectations, satisfy their needs, alter the environment, and respond to environmental changes. “Health” is therefore seen as a “resource for everyday life, not the objective of living.” The concept of health takes a positive stance, emphasizing that health not only contributes to physical capacities but also functions as a social and personal resource. Therefore, health promotion is also regarded as the original point of the concept of “quality of life,” aiming to maintain and improve living quality rather than merely promoting health.

At the WHO Health Promotion Conference in 1997, the “Jakarta Declaration” on Leading Health Promotion into the 21st century was adopted to identify the problems in health promotion in the 21st century onward and the directions the world should advance. At the conference, the following points were stressed: 1) comprehensive approaches would be effective in addressing problems in health promotion; 2) the participation of people would be essential to sustain efforts toward health promotion in communities; and 3) people should be at the center of health promotion activities and decision-making processes for effective health promotion.

The “8020 Campaign” and health promotion campaign has had a great impact on health activities in Japan. However, a more diversified thinking method is required to determine the role of health guidance and the population approach as a measure for health promotion; for example, enhancing collaborations among parties concerned and multiple professions, promoting cooperation among different professions and multiple professions, and creating an open and flat relationship. The three basic strategies of the Ottawa Charter for health promotion are: 1) advocate, 2) enable, and 3) mediate. The five strategies of the Jakarta Declaration are: 1) to promote social responsibility for health, 2) to increase investments in health development, 3) to reinforce and expand partnerships for health, 4) to increase community capacity and empower the individual, and 5) to secure infrastructure for health promotion. Today’s concept of health promotion has been developed based on the above-mentioned strategies advocated by the WHO¹³⁾.

“8020 Campaign” and health promotion campaign

Health promotion campaigns have generally been run by dental associations in each prefecture, rather than led by the Japan Dental Association. Each prefectural dental association devises a distinctive and unique campaign. Specifically, their campaigns include a project of training “8020 Campaign promoters” developed by the Shizuoka Prefecture Dental Association and other prefectural dental associations and introducing agricultural products as part of local-resources-based business represented by apples named 8020 in Iwate Prefecture. Accumulating experience in cooperation among professionals while promoting campaigns has become an essential foundation in the dentistry to promote national movements and population approaches.

Significance of family dentists

The significance of promoting the “8020 Campaign” and “oral frailty measures” is to help people achieve the common goal of eating, speaking, and laughing with their own mouths throughout their lives. Having a family dentist is essential for achieving this goal.

Since various information about dental care has recently been provided through the media, resulting in expanding the options when choosing a dental clinic. Under such circumstances, to maintain oral health throughout our life from infancy to old age, to prolong healthy life expectancy, it is important to have a “family dentist” who continuously offers appropriate treatment and management and provides advice on oral conditions whenever necessary. In November 2017, the Japan Dental Association reviewed the significance and role of “family dentists.”

Family dentists (from the viewpoint of the Japan Dental Association)

In recent years, the needs of the Japanese people and patients for dental care have diversified, and a wide variety of information regarding dental care has been provided through the media, expanding the options available when choosing a dental clinic. Under such a circumstance, eating, speaking, and laughing with our mouths throughout life would be our common goal.

To maintain oral health throughout our life, it is important from the viewpoint of prolongation of a healthy life expectancy to have a “family dentist” who continuously offers appropriate treatment and management and provides advice on our oral condition whenever necessary.

The Japan Dental Association clearly shows the significance of having a family dentist and the role of family dentists.

Family dentists

A family dentist is a dentist who not only provides safe and secure dental care but also fulfills his/her responsibilities as a person playing a part in medical care in a community. He/she is required to have a wide range of knowledge and insight related to medical and nursing care to maintain and improve the oral function of residents in the community throughout their lives.

Actual roles of family dentists

To contribute to the maintenance and promotion of oral and general health by offering continuous management and appropriate dental care and dental health guidance according to the patient’s life stage from infancy to old age to prevent aggravation of the oral condition.

In communities, 1) to play a role in improving oral health through health activities for the residents, such as dental examination in cooperation with the municipal government and related organizations, 2) to provide patients who have difficulty visiting dentists with seamless domiciliary dental care and long-term care services at various locations in cooperation with related local organizations and different professions, and 3) to participate in the integrated community care system.

Examples of roles of family dentists

- Offering initial treatment and continuous disease management necessary for preventing the aggravation of oral function
- Providing continuous and appropriate dental care at locations where patients receive medical treatment, such as individual homes, hospitals, and nursing homes, and actively participating in oral function management activities and a conference at the time of discharge as a member of a healthcare team
- Promoting collaboration with different professions while collaborating with other related organizations, such as administrative bodies, medical institutions with functions supporting home treatment, and nearby medical institutions
- Detecting dementia and child abuse through dental treatment at an early stage and promoting cooperation with related organizations
- Participating in public health activities such as dental examinations and lectures for residents
- Participating in the Certification Committee of Needed Long-Term Care and community care conferences
- Participating in activities related to dental health care as a cooperative medical and dental institution for long-term care insurance facilities

(Leaflet "Do you have a family dentist you can consult with about anything?") (Figure II-1)

Changes in oral diseases

Herein, we demonstrate the tendency of oral diseases Japanese people have developed since the introduction of the previously mentioned "8020 Campaign," based on statistical data such as the results of the dental disease survey.

Figure II-2 shows changes in the number of remaining teeth. The number of remaining teeth increased over time in all age groups. However, the figure shows that, on average, most people with 20 or more of their own teeth are aged 69 years or younger. The most recent survey showed that the average number of remaining teeth after the age of 70 years is less than 20. Therefore, efforts to increase the number of remaining teeth should be pursued in future studies. Figure II-3 shows the status of periodontal disease examined by the percentage of people with periodontal pockets at a depth of 4 mm or more (excluding people without their own teeth). In a 2016 survey, the status of periodontal disease worsened slightly in almost every age group ¹⁴. One reason for this context may be that an increasing number of people are attempting to maintain their own teeth despite the presence of severe periodontal disease because of the growing awareness about maintaining teeth. The circumstances underlying the worsening of periodontal disease should be investigated in detail. Meanwhile, the incidence of periodontal disease is increasing, even in the age group of 20–50 years, in which the incidence of dental caries has been declining. Therefore, detecting periodontal disease at an early stage while continuously making efforts toward reducing dental caries and enhancing dental health education, such as oral cleaning habits for periodontal disease prevention, would be challenging in the future.

Based on the results of the 2015 National Health and Nutrition Survey (Figure II-4), the percentage of people with subjective symptoms related to a decline in oral function for more than 6 months also increased with age: having difficulty eating tough foods/chewing well with both back teeth, choking, and having a dry mouth. Some people in all age groups have the aforementioned subjective symptoms ¹⁵. These tendencies have already been predicted in the future forecast of the demand for dental treatment presented by the Ministry of Health, Labour, and Welfare (Figure II-5). Measures for managing oral function are increasingly required, along with dental treatments.

あなたには
何でも相談できる

かかりつけ歯科医はいますか？

- 15～79歳の男女10,000人インターネット調査結果では歯科治療経験者の63%は「かかりつけ歯科医」がいると回答がある一方で、定期的に歯科受診している人は31%でした。

その先にある笑顔を守りたい。
公益社団法人 日本歯科医師会

かかりつけ歯科医は
口腔健康管理を通じて、
健康寿命の延伸に
貢献します。

かかりつけ歯科医とは

かかりつけ歯科医とは、安全・安心な歯科医療の提供のみならず医療・介護に係る幅広い知識と見識を備え、地域住民の生涯に亘る口腔機能の維持・向上をめざし、地域医療の一翼を担う者としてその責任を果たすことができる歯科医師をいう。

かかりつけ歯科医が担う役割

- ◆ 乳幼児期から高齢期までのライフステージに応じた継続管理や重症化予防のための適切な歯科医療、保健指導を行い口腔や全身の健康の維持増進に寄与すること。
- ◆ 地域住民のために行政や関係団体と共に歯科健診などの保健活動等を通じて口腔保健向上の役割を担う。
- ◆ 地域の関係機関や他職種と連携し、通院が困難な患者にさまざまな療養の場で切れ目のない在宅歯科医療や介護サービスを提供し、地域包括ケアに参画する。

発行：2018年12月

もっと早く「かかりつけ歯科医」に行っておけばよかった・・・

人生を振り返って、もっと早く歯の健診や治療をすればよかったと4人に3人が後悔しています。

もっと早くから歯の健診・治療をしてあげればよかったと思うか？

後悔の程度	割合
そう思う	41.5%
ややそう思う	34.2%
あまりそう思わない	19.2%
そう思わない	5.1%

75.7%がもっと早くからと後悔

15～79歳の男女10,000人にインターネット調査を実施した「歯科医療に関する一般生活者意識調査」より 公益社団法人 日本歯科医師会

「かかりつけ歯科医」への定期受診で口腔健康感が高まります

定期受診を実践している人では、していない人と比較して、自分の歯や口腔が健康だと感じている方の割合が約1.8倍高い。

定期受診者の口腔健康感

健康感	割合
健康だと感じる	62.4%
健康だと感じない	37.6%

定期受診者以外の口腔健康感

健康感	割合
健康だと感じる	35.2%
健康だと感じない	64.8%

15～79歳の男女10,000人にインターネット調査を実施した「歯科医療に関する一般生活者意識調査」より 公益社団法人 日本歯科医師会

Figure II-1. Leaflet “Do you have a family dentist you can consult with about anything?”

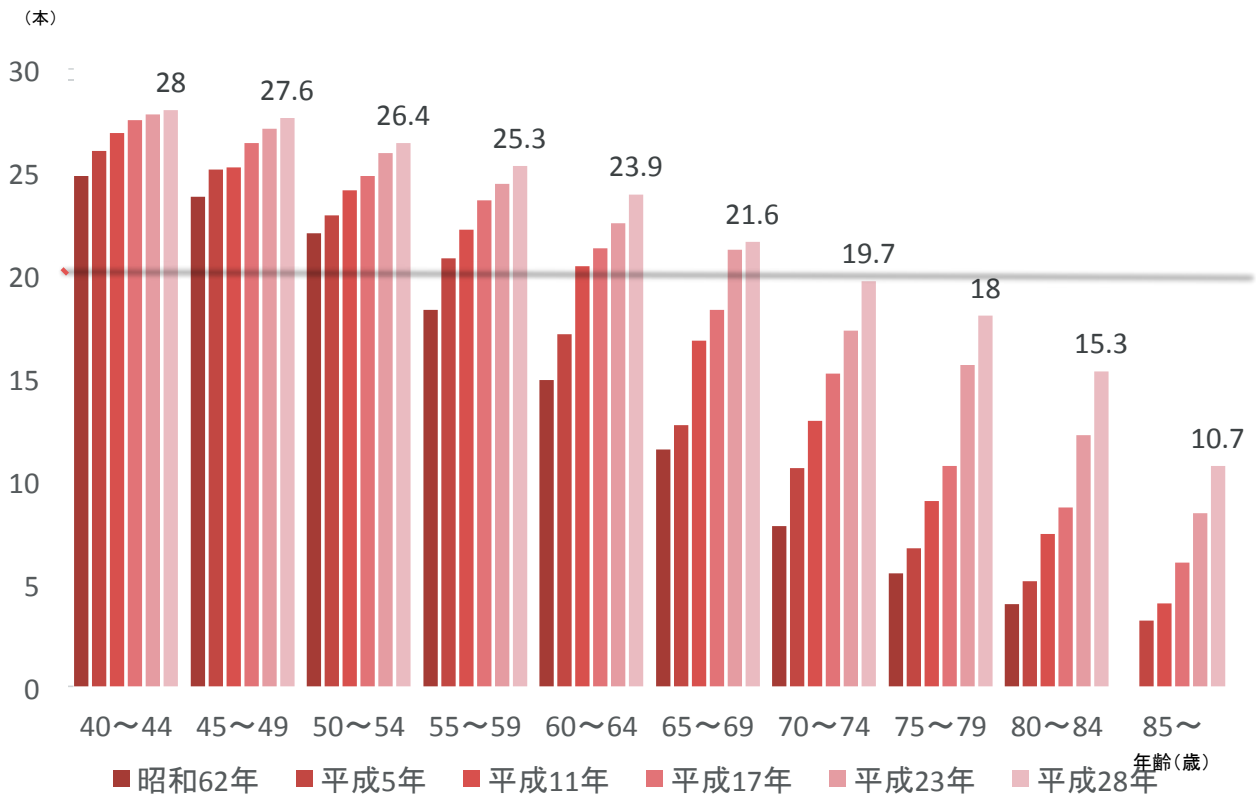


Figure II-2. Changes in number of remaining teeth over time by age

Source: Ministry of Health, Labour and Welfare: "2016 Survey of Dental Diseases"

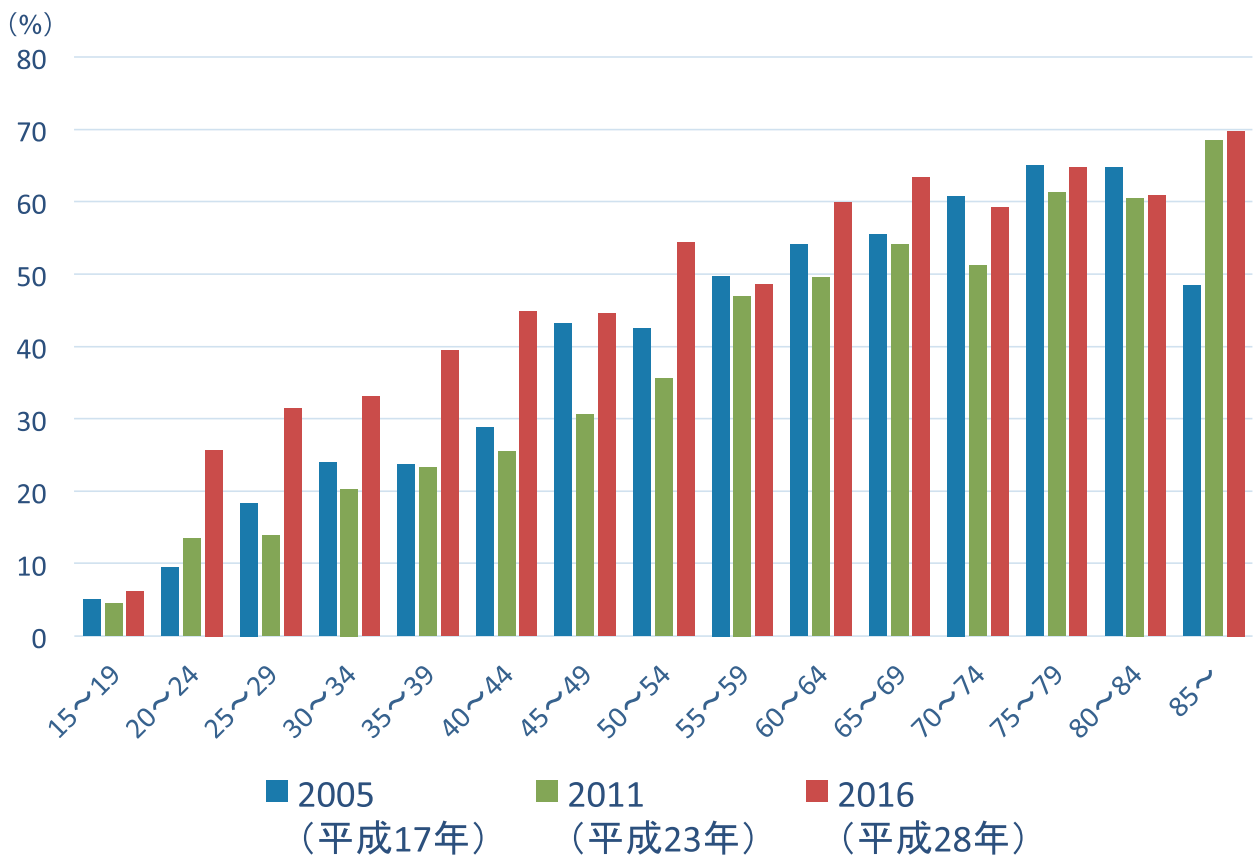
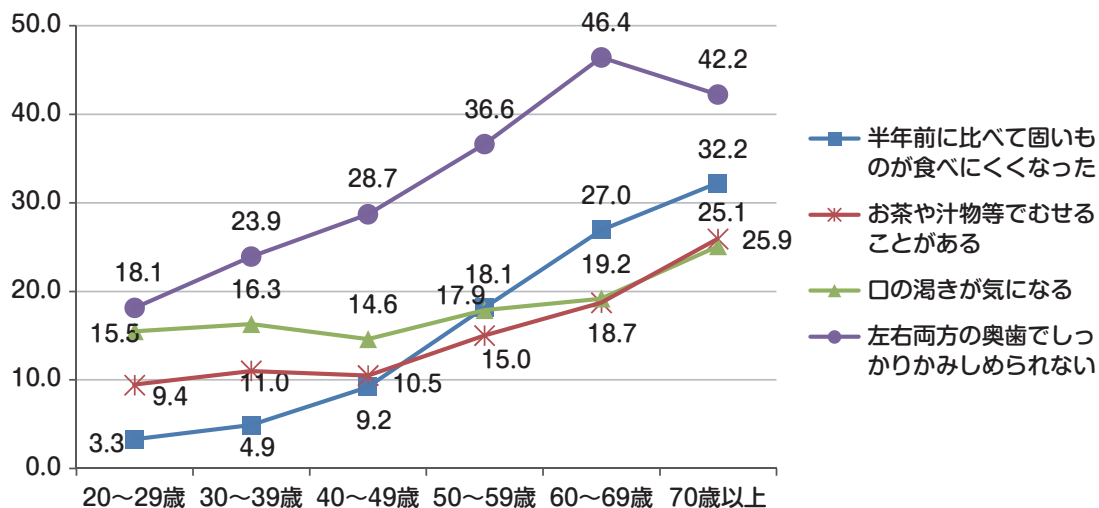


Figure II-3. Percentage of people having periodontal pockets with a depth of 4 mm or more (excluding people without their own teeth)

Source: Ministry of Health, Labour and Welfare: "2016 Survey of Dental Diseases"



※図中の数値は、「半年前に比べて固いものが食べにくくなった」、「お茶や汁物等でむせることがある」、「口の渇きが気になる」に「はい」と回答した者、「左右両方の奥歯でしっかりかみしめられる」に「いいえ」と回答した者の割合。

Figure II-4. Eating conditions

Source: Ministry of Health, Labour and Welfare: 2015 National Health and Nutrition Survey (modified)

歯科治療の将来予想(イメージ)

○ 人口構成の変化や、歯科疾患罹患状況の変化に伴い、歯の形態の回復を主体としたこれまでの「治療中心型」の歯科治療だけではなく、全身的な疾患の状況などもふまえ、関係者と連携しつつ患者個々の状態に応じた口腔機能の維持・回復(獲得)をめざす「治療・管理・連携型」の歯科治療の必要性が増すと予想される。

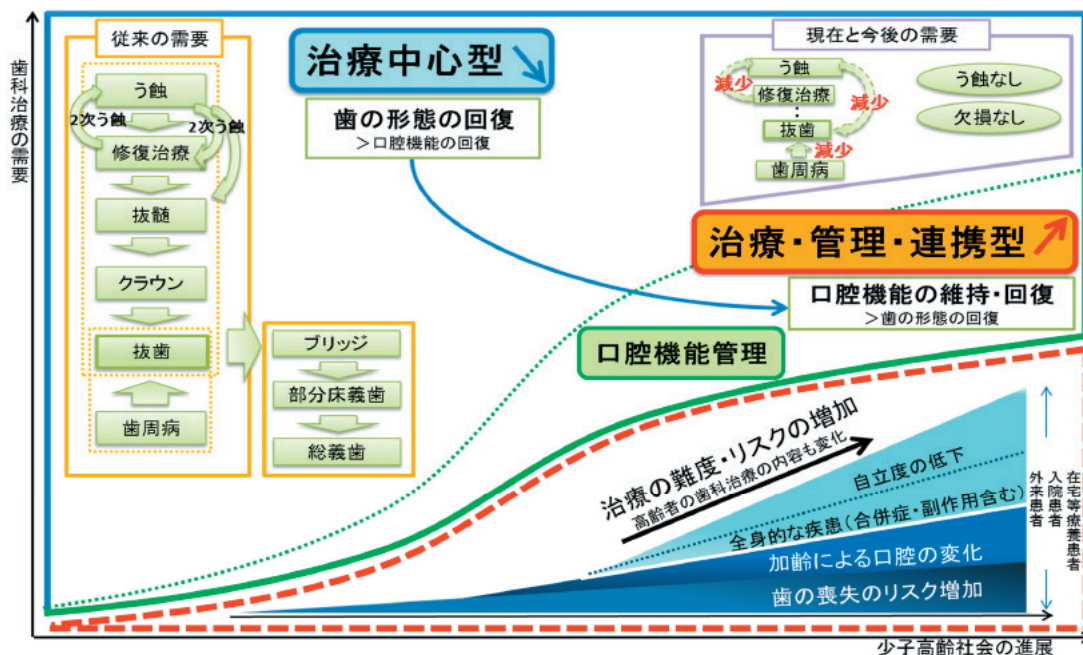


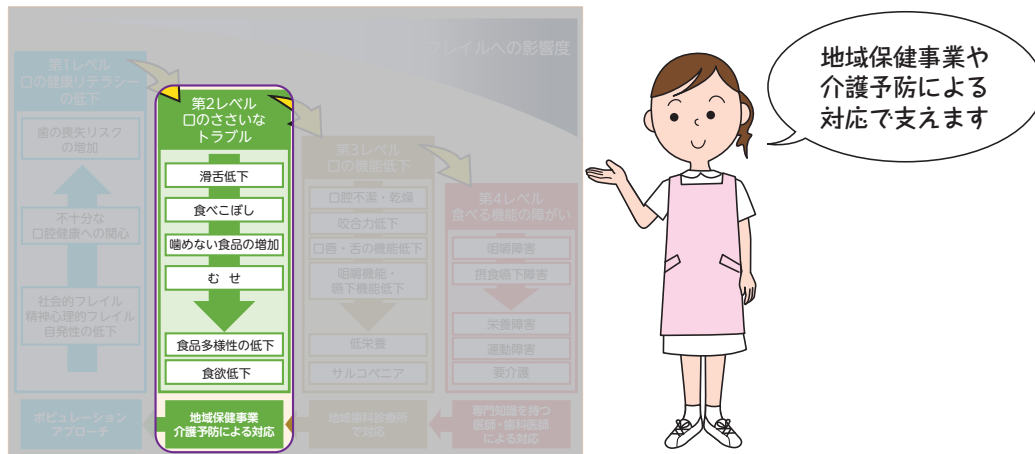
Figure II-5. Future forecast for dental treatment

Source: Ministry of Health, Labour and Welfare: Liaison Council for Social Insurance Directors of Prefectural Dental Associations (modified) issued on March 10th, 2018

【参考文献】

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- 14) 厚生労働省「歯科疾患実態調査 平成 28 年」
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2) 2nd level: Minor oral problems



Integrated community care system

The generation born during Japan’s postwar baby boom will reach the age of 75 years or older in 2025. An effort to establish a system (integrated community care system) by around 2025 is being promoted, where medical care, long-term care, preventive care, housing, and living support services are secured comprehensively so that even people requiring intensive long-term care can continue living in a familiar region with a lifestyle that suits them until the end of their lives. The late-stage older adult population aged 75 or over is expected to increase rapidly in metropolitan areas, while in rural areas, population decline is expected despite a moderate increase in the late-stage older adult population aged 75 or over. This tendency indicates large regional differences in the progress of an ageing society. Therefore, the principle of integrated community care system is that municipalities and prefectures create a system appropriate for each of them based on their own decisions and initiatives, depending on the characteristics of each region ¹⁶⁾.

Herein, we present a schematic diagram in the shape of a flowerpot to show the components of the integrated community care system modified in 2016. In this diagram, “medical care/nursing care,” “long-term care/rehabilitation,” and “health/welfare services” are expressed in three leaves as services provided by professionals. The diagram also shows the significance of the basic elements of “services for care prevention and life support” and “services for housing and securing a better way of living.” These elements are expected to interrelate and be provided in an integrated manner as a precondition for each service sector to function sufficiently. Furthermore, when a person decides whether to continue living in the community, a top priority should be given to “his/her own decision.” Based on the idea that how the person prepares to make a decision and his/her family prepares to accept the decision is essential, “the person’s decision and the preparedness of the person and his/her family” is positioned as a saucer holding the flowerpot (Figure II-6) ¹⁷⁾.

The integrated care program for preventing a person from



Figure II-6. Components of the integrated community care system

Source: 2015 project promoting health in the elderly: Research business report on systems and services for establishing Integrated Community Care System

developing a condition requiring long-term care (hereafter, care prevention) and supporting daily life (hereafter, daily life support) aims to provide health and preventive care services in an integrated manner for older adults and create a place allowing people to improve their health through a population approach that is available not only to older adults with frailty but also to the general adult population; in other words, providing the older adults with an opportunity to communicate with each other (Figure II-7).

The integrated care program consists of (1) a service program for care prevention and daily life support, which has been developed as an alternative to the conventional home-visit service for preventive care for the purpose of providing necessary support for people requiring long-term support and other, and (2) a general program for care prevention that has been developed to provide preventive care services such as exercise classes for first insured people ¹⁸⁾.

Applicants for the integrated care program must first receive the checklist prepared by each municipal government or the basic checklist at community-based integrated support centers, medical institutions, pharmacies, salons, or other places and then fill in the checklist. Then, based on the checklist, individuals eligible for the service program for care prevention and daily life support are selected (Figure II-8) ¹⁹⁾.

(1) General program for care prevention

(Details of the program)

The General Care Prevention Program is included in the Integrated Care Program for Care Prevention and Daily Life Support. The service program is an approach with the following targets: 1) to share the roles with other service programs, such as service programs carried out under each municipality's own financial resources, service programs based on mutual support in each community, and service programs provided by the private service sector, 2) to improve the environment of service donor sites in a community managed by its residents, where none of older adult is discriminated by their ages, physical and mental conditions, and other factors, 3) to promote the development of such

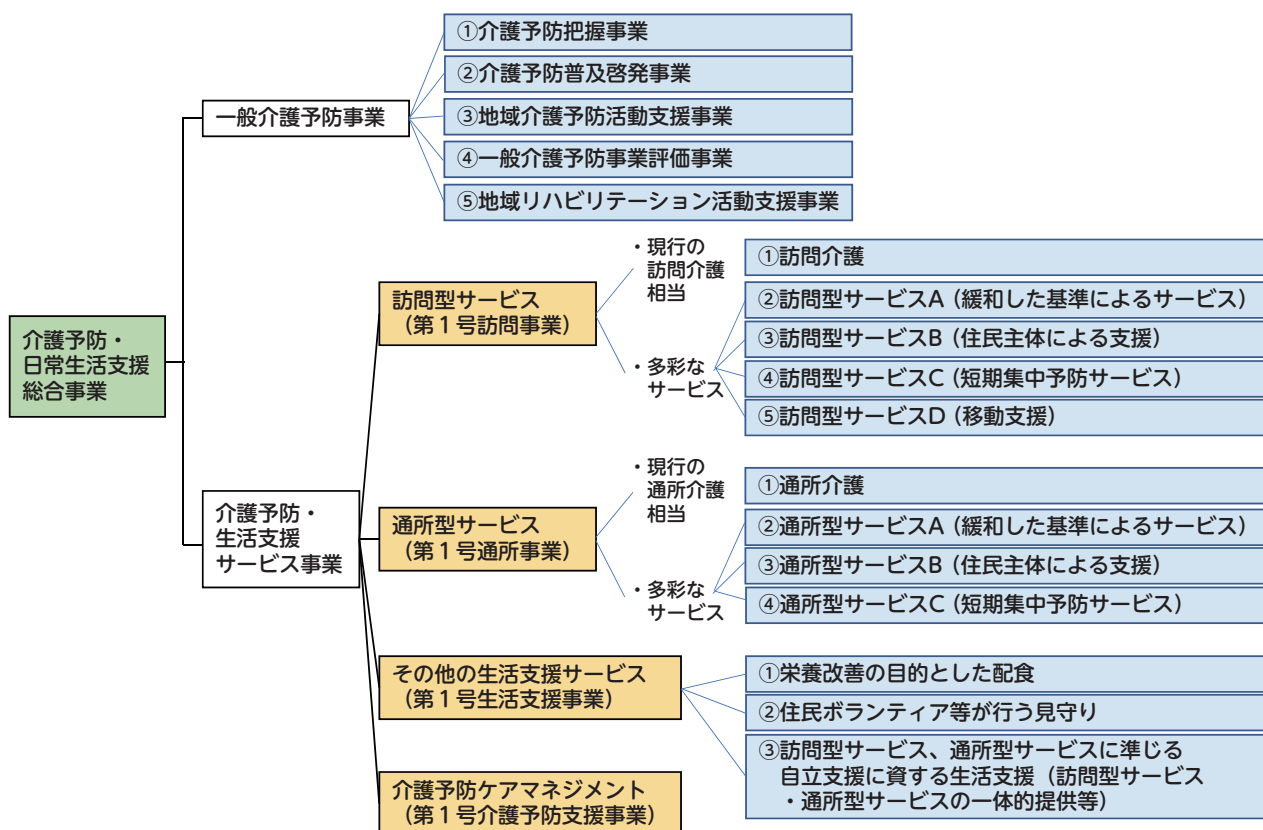


Figure II-7. Composition of the integrated care program for care prevention and daily life support

Source: Division of the Health for the Elderly, the Ministry of Health, Labour and Welfare: Role of dental health care in the integrated community care system (modified)

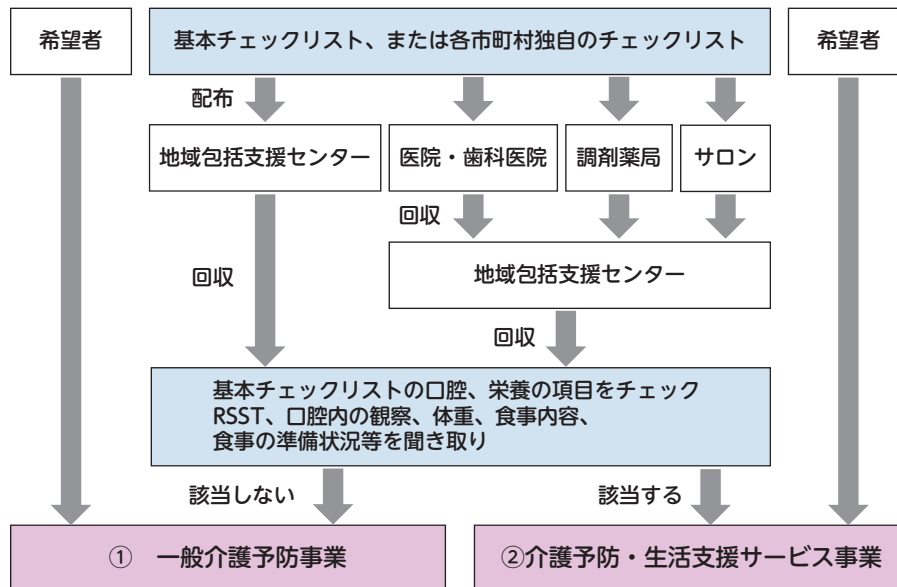


Figure II-8. Flow selection of individuals eligible for the integrated care program for care prevention and daily life support

Source: 2016 Reports on health promotion projects for the elderly (reports on subsidies for projects promoting health business for the elderly): "Guidebook for introducing the activities for improving the oral function and nutritional condition through the integrated care program for care prevention and daily life support (modified)

a community that the number of participants and the scale of service continuously increase through connection among people, 4) to promote efforts toward contributing to self-reliance support in each community by making good use of the abilities and knowledge of rehabilitation specialists and others, and 5) to realize a community where people can live with purposes and roles even if they need long-term care.

The general program for care prevention consists of the following five programs: 1) selecting people in need of support, 2) enlightening the significance of care prevention, 3) supporting community-based activities for care prevention, 4) evaluating the general program for care prevention, and 5) supporting community-based rehabilitation activities.

Activities to improve oral function and nutritional status are included in the conventional secondary prevention program for long-term care. Currently, these activities are carried out under the "program to highlight the significance of care prevention." Individuals eligible for the conventional secondary prevention program for long-term care were determined based on a basic checklist. One of the benefits of including the above-mentioned activities in the "program to enlighten the significance of care prevention" of the general program is that all older adults aged 65 or more are eligible for the activities. Specific activities included organizing classes on preventive care for frailty and lectures from the perspective of improving oral function and nutritional conditions, implementing "healthy mouth exercises" based on community-led activities, and preparing various types of pamphlets.

(People eligible for the program)

All first-insured people and those involved in the activities to support them were eligible for the program.

(2) Service program for care prevention and daily life support

(Details of the program)

The service program for care prevention and daily life support supports a wide range of services as the subject of the comprehensive program to respond to the diversified life support needs of people requiring long-term support. These services include home-visit care for care prevention and services provided by community residents.

This program consists of the following: 1) home-visit long-term care services, 2) outpatient day care services, 3) other life support services, and 4) care management services for care prevention.

(People eligible for the program)

People eligible for the program are basically those in need of long-term support. There are two different flows until people receive services: one is for people requiring long-term support and the other for people eligible for the service program for care prevention and daily life support. People incorporated in the former flow first need to receive a certification of long-term care needs and then receive preventive care management services. In the latter flow, people eligible for the service are determined through a simple procedure using a basic checklist, and necessary services are provided through preventive care management services.

When utilizing a home-visit long-term care service for care prevention and a rental service for equipment for long-term care, categorized as preventive benefit services, people are required to receive a certification of long-term care needs. On the other hand, when utilizing only the services provided through the service program for care prevention and daily life support, people are allowed to use the services through the abovementioned simple procedure without applying for certification of long-term care needs.

Those not qualified for long-term care should have access to the aforementioned general program for care prevention.

Oral frailty measures under the integrated community care system

Other important efforts to establish an integrated community care system include holding community care conferences at regional comprehensive support centers and other facilities with the aim of enhancing multidisciplinary collaboration, securing the home treatment system, promoting cooperation between medical care and long-term care systems, and promoting cooperation among multidisciplinary teams at the community level. Since 2018, frailty measures have been prioritized in projects promoting the integrated community care system. A survey of elderly people residing in a community revealed the possibility of oral frailty occurring before its onset. The survey also revealed that oral frailty has an impact on the chain of events ranging from frailty, sarcopenia, and long-term care need to the death (Figure I-7). Since the survey results were reported, attention has been focused on preventive measures for oral frailty among frailty measures. To prevent oral frailty, raising public awareness of oral frailty is essential to allow the elderly and their families to understand it. It is also important to include services aimed at preventing oral frailty among the care prevention and life support services provided by the community and various entities, such as Non-Profit Organizations (NPOs).

Individuals with frailty can be restored to health if appropriate measures are adopted. Therefore, early diagnosis and treatment are essential. Detecting and treating oral frailty at an early stage will lead to the early identification and treatment of people who are highly likely to develop frailty. Oral frailty is closely related to the transition from the frailty stage to a stage requiring long-term care. Therefore, oral frailty measures are essential to prevent severe frailty.

Conventional service programs for care prevention use a basic checklist to identify elderly people eligible for secondary prevention for long-term care services. Professionals such as public health nurses and dental hygienists have provided short-term care prevention services for elderly people who may need long-term care. However, secondary prevention for long-term care service was ineffective because the extraction method of elderly people eligible for the service was inappropriate, and a limited number utilized the service. Therefore, the extraction of elderly people eligible for secondary prevention for long-term care services was stopped. Instead of conventional service programs, a care prevention service program that targeted all elderly people, ranging from healthy to high-risk, was initiated. However, a shortcoming of the new system is that it is difficult for professionals to provide care prevention services for all of them because the new system targets all elderly people. Community-led services for care prevention and life support were introduced to address this shortcoming. These are service programs provided mainly through voluntary activities of residents at the community level based on the mutual support concept to handle various problems of elderly people. These services have been provided in various ways, such as meeting place activities, day services, and home visit care services. However, oral health care services have not yet become common because of the high degree of specialization in oral health care services and the lack of information on the importance of oral health care.

On the other hand, services provided through meeting-place activities, which constitute the core of care prevention services in the integrated community care system, have problems not only with oral health care services but also with other services.

- 1) Difficulty in maintaining the quality of services because the services are frequently provided by non-professionals
- 2) Insufficiency in risk management: when problems arise, dealing with the problems is difficult
- 3) Difficulty in continuously supporting those unable to adapt to the meeting place and those who no longer visit the meeting place because of physical hypofunction or other reasons. It is also difficult to lead the target person who has withdrawn from the service to different services.
- 4) Difficulty in providing support for the target person who rejects the services because of social withdrawal or other reasons

Currently, information on oral frailty is provided to community residents through a municipality-sponsored program to highlight the significance of care prevention. In the future, dental associations will also provide the latest evidence-based information to dental clinics in communities, with the expectation that the information will be transmitted to the community through patients who visit dental clinics. There are 70,000 dental clinics nationwide, the most substantial medical resources available in the communities. If the correct information is provided to patients by dental clinics, those patients will play a major role in community-led services, thereby ensuring their quality. Family dentists, dental hygienists, and other professionals can support service providers in managing risks. Under this system, family dentists can cope with problems even when they arise. This system will also make it possible to lead the target person who has withdrawn from the service to different community-led or other public services through different Regional Comprehensive Support centers (Figure II-9) ²⁰⁾.

Since dental diseases cause severe pain and affect eating capability, even elderly people who are homebound and hesitate to participate in the integrated community care system visit dental clinics when their dental diseases worsen. At dental clinics, dentists check oral functions and identify problems with eating, conversation, and other daily activities. Based on these findings, it may be possible to encourage the elderly to develop the integrated community care system. If they are involved in the care system, they will not only receive oral health care services but also utilize them for care prevention and life support. Therefore, those elderly people will receive multidisciplinary support.

Unlike medical clinics, dental clinics are not subdivided according to specialties. Therefore, dentists and dental hygienists treat patients of all age groups, from children to adults to the elderly. Family dentists and dental hygienists can first observe how oral function changes throughout the patient's life or from development and growth to decline. They judged the patient's current situation based on the findings obtained through continuous observation, not those obtained at a specific point in time. Accordingly, they are able to predict, to some extent, the functional deterioration and resultant problems that will occur in the future and cope with these problems in advance. Dentists have the characteristics of family physicians. Therefore, dentists can indirectly provide information on oral frailty in elderly people who tend to be homebound through their family members. If family members detect oral problems in elderly individuals, dentists are able to deal with the problems at an early stage. Therefore, dental clinics can serve as a community safety net.

In 2018, when frailty measures became a prioritized issue in the project promoting the integrated community care systems, a disease named "oral hypofunction" became usable when insurance medical/dental treatment facilities claim for a medical fee. Since then, medical management has become applicable for patients with declining oral

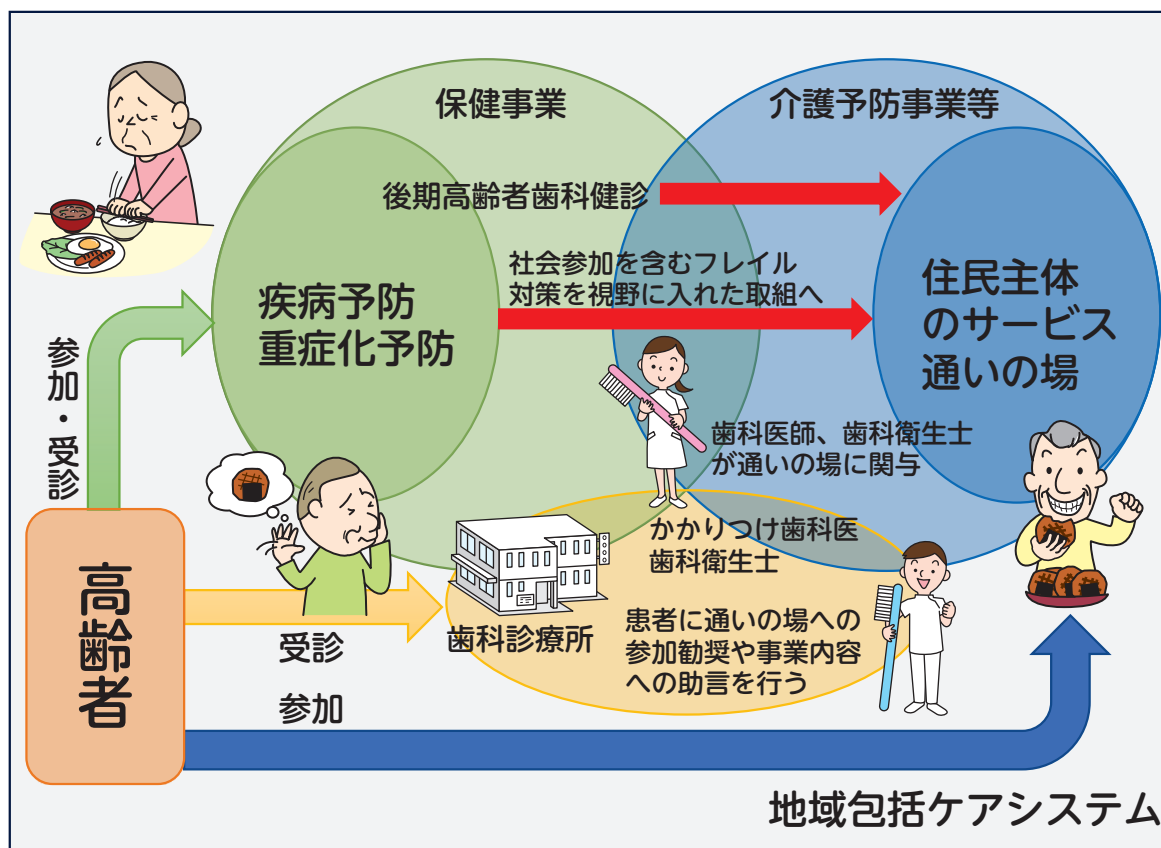


Figure II-9. Regional Comprehensive Care System for the elderly: advancing the health project and the care prevention project in an integrated manner

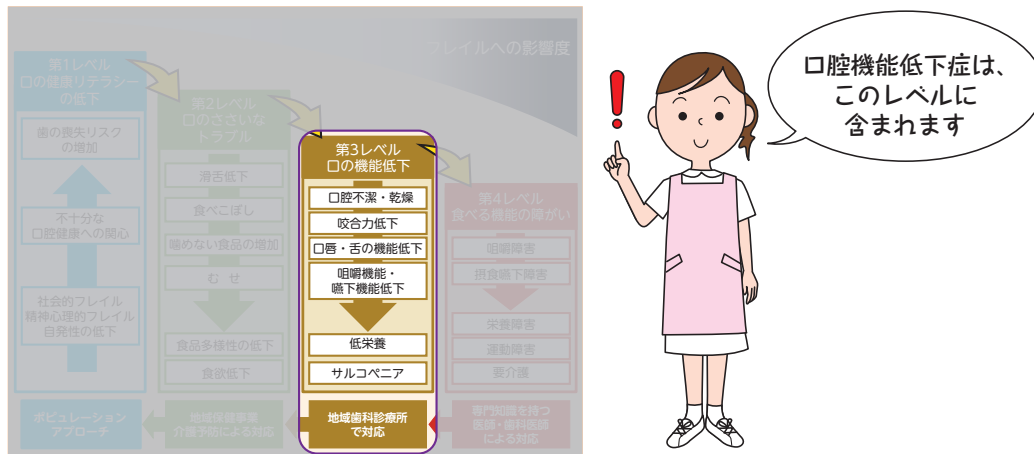
Source: Document #2, The 5th Expert Committee for the advancement of health project and care prevention project in an integrated manner (modified)

function. Consequently, oral hypofunction has become a subject of objective evaluation and continuous management. These events will contribute to establishing a patient-centered collaborative model between dental clinics and community-based service providers and promoting the integrated community care system.

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3) 3rd level: Decline in oral function



Decline in oral function

Oral function comprises a complex of various functions, such as mastication, swallowing, pronunciation, gustation, and salivation. When detecting declined oral function, dentists have examined and treated individual functions because treatment of declined oral function requires a high degree of specialization. For example, if a problem was detected on the examination of masticatory function, the patient was treated for a masticatory disorder. Few dentists observed the entire oral function. Therefore, the functions in the oral cavity are mutually related. Understanding oral function in an integrated manner is required to understand the relationship between oral function, nutrition, and vital prognosis.

Oral function assessment was carried out for the following three factors: oral environments, such as hygiene conditions, saliva volume, number of present teeth, and denture conditions; individual functions, such as muscle strength and movements of the lips, tongue, masticatory muscles, and other organs; and integrated function formed by a combination of individual functions, such as mastication, swallowing, and pronunciation.

The third level of oral frailty is a state in which multiple functions of the oral cavity are comprehensively compromised (Figure II-10). At this stage, other functions compensate for impairments in individual functions. As a result, impairments in integrated functions, such as masticatory disorder and dysphagia, are seldom observed in patients at the third level, which are the symptoms observed in those at the fourth level.

Examination of oral function

Since the oral function is composed of many complex factors, evaluating oral function through a single examination is difficult. It is necessary to understand the whole image of the oral function through various objective and subjective examinations. At the third level, the decline in individual function is generally mild, and many patients demonstrate few subjective symptoms. It is essential to detect not only a state where a specific function is declining but also a state where multiple functions are gradually declining (see Part III for details of the examinations).

Patients categorized as the "third level: decline in oral function" includes those diagnosed as having oral hypofunction²¹⁻²³⁾ (see column "Oral frailty and hypofunction"). The examination of oral hypofunction consisted of seven test items: oral hygiene, dry mouth, occlusal force, tongue-lip motor function, tongue pressure, masticatory function, and swallowing function. These are representative test items for patients categorized at the third level.

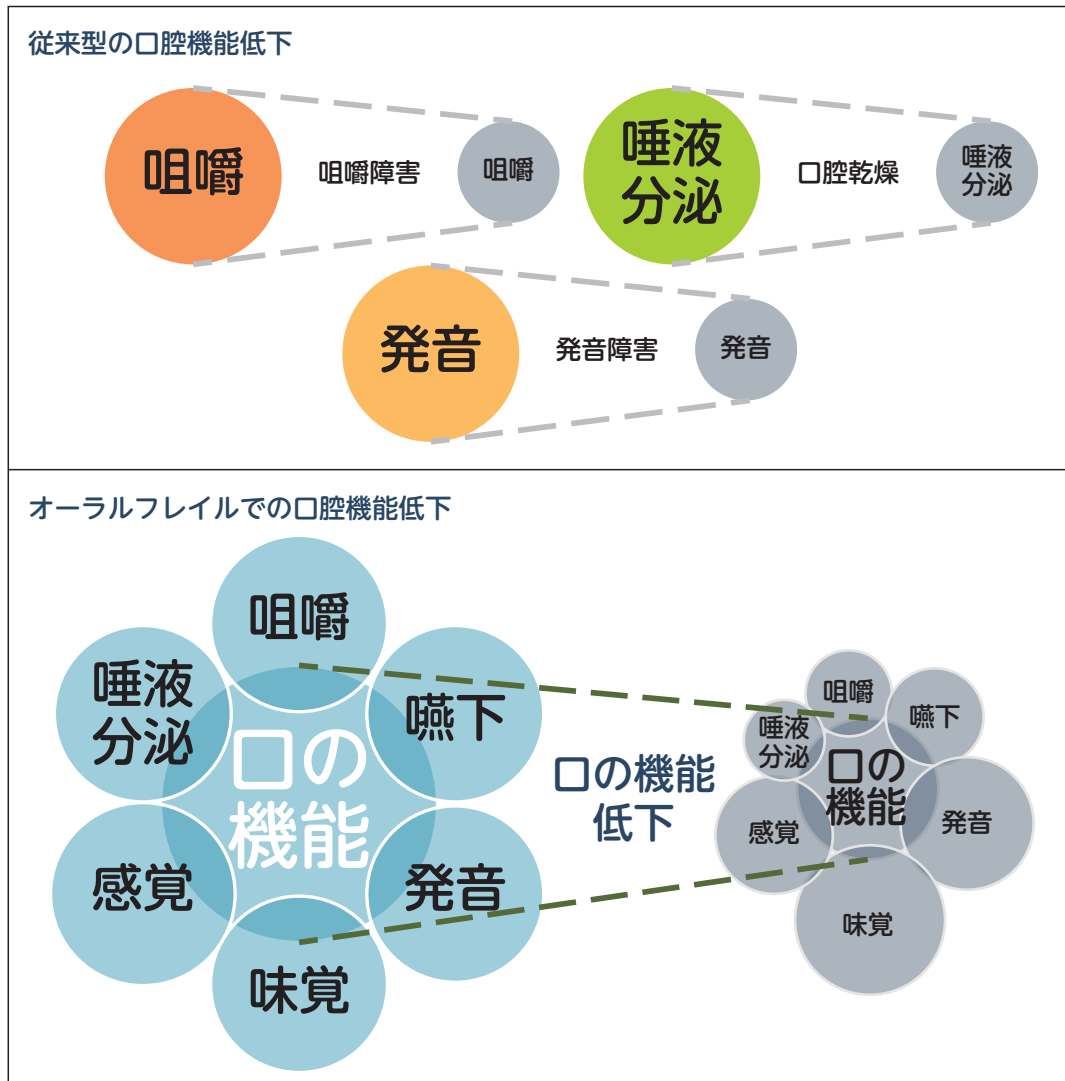


Figure II-10. Difference in understanding the declined oral function between the conventional concept and the oral frailty concept

Dentists have conventionally dealt with declined oral function while focusing on evaluation and treatment for individual functions. For example, a decline in masticatory function has been diagnosed as a masticatory disorder, and a problem in speech function has been diagnosed as a speech disorder. Treatment was also carried out for each functional decline. On the other hand, in the concept of oral frailty, declines in multiple functions are observed comprehensively. Therefore, examination and evaluation are carried out comprehensively for multiple functions composing the oral function. When some functional decline is observed, the decline is treated with oral rehabilitation and functional care. Based on the examination results, a comprehensive management plan is formulated to maintain and improve oral function while considering the patient's social and psychophysiological backgrounds.

Source: Takayuki Ueda, Tokyo Dental College

Since the abovementioned examination is unable to assess all oral functions, other examination methods should be applied when necessary. For example, people with poor oral lip-closing force may develop various symptoms, such as spilling food from their mouths during meals, poor articulation of bilabial sounds, and difficulty swallowing due to insufficient swallowing pressure. In these patients, lip-closing force should be measured as necessary. "Lipple-kun"

(Shofu Inc.) is a convenient device for measuring lip-closing force. Suprahyoid muscle strength is reportedly related to the swallowing function. For measurement of mouth-opening force, “mouth-opening trainer KT 2016” (Livet Inc.) is also useful.

Oral function should be evaluated based on objective numerical data obtained from testing equipment and subjective data obtained from individual patients. Effective tools for subjective evaluation of masticatory function include the masticatory function evaluation table proposed by Sato et al.²⁴⁾ and the dietary variety score²⁵⁾. In the evaluation, asking a patient what kind of food they want to eat will be meaningful because the response to the question would be useful for setting goals of oral function management, leading to the sharing of goals between the patient and the dentist in charge.

Patients at the third level frequently manifest undernutrition owing to declined oral function. Therefore, it is essential to check the body mass index and changes in body weight. Oral rehabilitation and functional care include not only functional training but also dietary counseling and nutritional education. Guidance on cooking methods for patients with declined oral function and on the use of nutritional supplements are also provided. A previous report showed the necessity of collaboration between dentists and registered dietitians to promote sarcopenia and frailty measures²⁶⁾. Cooperation of multidisciplinary team, including dentists and dental hygienists, is required in the future.

Summary

For patients at the stage of the third level, showing the oral function as data is to “visualize” the function. A common “scale” is indispensable for information sharing when the management of oral frailty is promoted through team medical care or interprofessional work. From this point of view, the examination of oral hypofunction is useful because the test items are standardized, and the reference values for the test items are also secured.

When dental professionals explain functional conditions to patients, numerically shown test results would be effective for patients to understand their current status. Therefore, it is of utmost importance to popularize oral function examinations, such as blood pressure and glycated hemoglobin measurements, to allow patients to understand the functional conditions of their oral cavities easily. Being aware of one’s oral health is the first step toward maintaining and managing healthy oral functions that allow one to continue enjoying eating.

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C O L U M N

Oral hypofunction

Oral hypofunction

Oral hypofunction is defined as “a disease in which oral function declines complexly due to various elements, such as diseases and disabilities in addition to age changes.”²⁷⁾ If oral hypofunction remains untreated, the patient might develop masticatory disorder and dysphagia, or the patient’s oral function is aggravated and reaches the fourth level of impairment of eating function. These conditions can cause irreversible impairment in oral function and general health. In addition, negative oral factors, such as dental caries, periodontal diseases, ill-fitting dentures, ageing, and systemic diseases, can impair oral function in the elderly. Declining oral function is affected by several factors, such as undernutrition, disuse, and side effects of drugs, and sometimes presents with complicated pathological conditions. Therefore, it is necessary to appropriately manage oral function while considering the living environment and general condition of the elderly.

Since the concept of oral hypofunction was developed considering the abovementioned matters, it is strongly reflected in the examination and management of oral hypofunction. After being acquired at birth as a function of suckling and phonation, oral function gradually matures as people grow. Few changes in oral function occur during adolescence. However, in middle or later age, oral function gradually declines owing to physiological and pathological age-related changes. Therefore, if problems arise at the stages of acquisition and maturation of oral function, the patient is diagnosed with “development failure of oral function,” while if the acquired function declines due to physiological and pathological age-related changes, the patient is diagnosed with “oral hypofunction.”

The essence of oral hypofunction prevention is to correctly understand the decline in oral function from adulthood onward and make efforts toward maintaining and improving oral function before the level of oral function is reduced to the fourth level or masticatory disorder and dysphagia appear.

Matsuo et al. analyzed the relationship between the nutritional status (Mini Nutritional Assessment-Short Form or MNA[®]-SF) and the five test items included in the examination of oral hypofunction: Poor oral hygiene, oral dryness, number of remaining teeth, tongue pressure, and tongue and lip functions. The analytical results showed that the average MNA-SF score reached the undernutrition level when three or more test items had a measurement value below the reference value²⁸⁾. This study showed that untreated oral hypofunction might induce undernutrition.

Relationship between oral hypofunction and frailty²⁹⁾

Oral hypofunction was included at the third level. Concept of oral frailty aims to apprehend the entire oral function. Currently, the test items of examination of oral hypofunction allow evaluation of functional deterioration representing the stage of “the third level: decline in oral function.” However, not all oral functions are covered by these test items. Since the oral function is composed of a complex of various functions, as mentioned previously, it is not feasible to examine all oral functions. Furthermore, there are time and economic restrictions in conducting examinations.

The term “oral frailty” is also expected to be a catchphrase for raising public awareness of oral health care. On the other hand, oral hypofunction is a disease name provided based on the examination results. Therefore, it is essential to raise public awareness of the necessity of undergoing examinations of oral function through the term “oral frailty” and have people undergo examinations of oral hypofunction in dental offices. These efforts will eventually lead to early detection and treatment of oral hypofunction.

Examination and diagnosis of oral hypofunction

Figure II-11 presents a basic overview of oral hypofunction diagnosis and management under the health insurance treatment system²⁷⁾. Oral hypofunction was diagnosed by examining seven test items (Table II-1). Regarding the items for which two different types of test methods are available, please choose either (please refer to Part III for test methods).

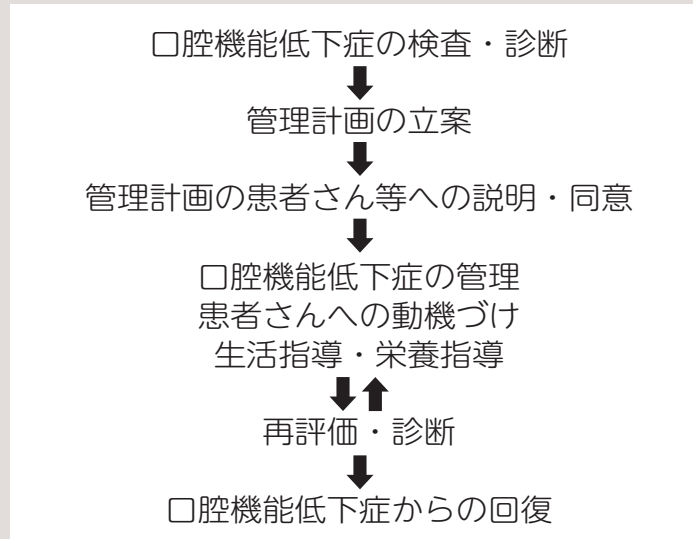


Figure II-11. Basic overview of diagnosis and management of oral frailty under the health insurance treatment system

Table II-1. Examination of oral hypofunction When two different types of test method are available, choose either of them.

	検査項目	検査内容	検査法・検査機器	該当基準
口腔環境	①口腔衛生状態不良 (口腔不潔)	舌苔付着程度	視診 (Tongue Coating Index)	50%
	②口腔乾燥	粘膜湿潤度	口腔水分計 (ムーカス)	27.0 未満
		唾液量	サクソントテスト	2.0g/2分以下
個別の口腔機能	③咬合力低下	全歯列最大咬合力	感圧フィルム (デンタルプレスケールⅡ)	500N 未満
		残存歯数(残根、動揺度3の歯を除く)	視診	20本未満
	④舌口唇運動機能低下	オーラルディアドコキネシス (/pa/, /ta/, /ka/それぞれの音節の発音回数)	自動計測機 (健口くんハンディ) IC法、電卓法、ペン打ち法など	どれか1つでも、6回/秒未満
	⑤低舌圧	最大舌圧	舌圧測定器 (JMS舌圧測定器)	30kPa 未満
統合された口腔機能	⑥咀嚼機能低下	グミ咀嚼後のグルコース溶出量	咀嚼能力検査システム (グルコセンサー)	100mg/dL 未満
		グミ咀嚼後の視覚的粉砕度判定	咀嚼能率スコア法 (咀嚼能力測定用グミゼリー)	スコア2以下
	⑦嚥下機能低下	主観的嚥下機能評価	自記式質問紙法 (EAT-10) 質問紙法(観察記録でも可) (聖隷式嚥下質問紙)	3点以上 Aが1つ以上

1) Poor oral hygiene (oral uncleanliness)

Poor oral hygiene (oral uncleanliness) is a state in which microorganisms grow abnormally in the oral cavity of an elderly person, which may cause several diseases, such as aspiration pneumonia, postoperative pneumonia, postoperative infection, and oral infectious disease.

The tongue coating index (TCI) developed by Shimizu et al. is used to assess the severity of tongue coating. In the TCI evaluation, the dorsum of the tongue is divided into nine subregions. The severity of tongue coating in each subregion is evaluated using the tongue coating scores. A TCI of 50% or more indicates poor oral hygiene.

2) Dry mouth

Dry mouth refers to abnormal oral dryness or a condition where people manifest subjective symptoms accompanied by a feeling of dryness. A dry mouth is assessed using an oral moisture-checking device or measuring the salivary flow rate.

An oral mucosal moisture meter, "Mucus" (Life Co., Ltd.), is generally applied as an oral moisture-checking device. The moisture content of the oral mucosa is measured on the dorsum of the tongue 10 mm from the apex. A diagnosis of dry mouth is made with a measurement value < 27.0.

The salivary flow rate is measured using the Saxon test. In the Saxon test, a patient is required to chew dry gauze (dry mass: 2 g) for 2 min at a certain speed. The amount of saliva absorbed by the gauze is then measured. The amount of saliva < 2.0 g/ 2 min indicates a dry mouth.

3) Decline in occlusal force

Declined occlusal force refers to a decline in bite force in individuals with natural teeth or dentures. Occlusal force is assessed using occlusal force measurements or the number of remaining teeth.

In the occlusal force measurement, the occlusal force of the entire dentition is measured using a combination of the Bite Force Analyzer (GC Corporation), an analytical instrument, and either the Dental Prescale System (GC Corporation) or Dental Prescale System II (GC Corporation) both of which utilize pressure-sensitive films. An occlusal force of the entire dentition < 200 N using the Dental Prescale System or < 500 N using the Dental Prescale System II indicates a decline in occlusal force. Examinees who use dentures daily undergo occlusal force measurements while wearing dentures. However, as the measurement values depend on the thickness and sensitivity of the pressure-sensitive film, they cannot be compared with the measurements obtained from different systems or the occlusal force of individual teeth.

In the occlusal force measurement using the number of remaining teeth, teeth with grade 3 mobility, stump teeth, pontics of the dental bridges, and implant superstructures were excluded. People with < 20 remaining teeth are diagnosed as having decreased occlusal force because it has already been reported that there is a correlation between the number of remaining teeth and occlusal force.

4) Decline in tongue/lip motor function

A decline in tongue/lip motor function is defined as a decline in the speed and dexterity of tongue and lips movements resulting from decreased functions of the brain, nervous system, and perioral muscles due to systemic diseases and age changes. Declining tongue/lip motor function may affect eating behavior, nutritional intake, living functions, and quality of life (QOL).

Tongue/lip motor function was assessed based on oral diadochokinesis (the ability to repeat monosyllables). Methods for measuring oral diadochokinesis include the dot, calculator, and automatic counter. The Kenkokun Handy (Takei Scientific Instruments Co.) is recommended for its precision and simplicity. People who use dentures in daily life undergo oral diadochokinesis assessment while wearing dentures. Examinees are required

to repeat monosyllables of “pa,” “ta,” and “ka” for 5 s each. The number of repetitions for each monosyllable was calculated using this device. If the number of repetitions is <6.0 times/s for one or more monosyllables, a declined tongue/lip motor function diagnosis was made.

5) Decline in tongue pressure

Decreased tongue pressure is a condition in which the pressure between the tongue and the palate or food during mastication, swallowing, and speaking decreases because of a decline in tongue muscle function. Since decreased tongue pressure affects normal masticatory function and bolus formation, people with decreased tongue pressure are highly likely to have difficulty taking necessary nutrients in the future. The maximum tongue pressure was measured using a JMS Tongue Pressure Measurement Device (JMS Co., Ltd.). Examinees who used dentures in daily life underwent maximum tongue pressure measurements while wearing dentures. A maximum tongue pressure < 30 kPa indicates a decline in tongue pressure.

6) Decline in masticatory function

People with decreased masticatory function may have an increasing number of foods that they are unable to chew sufficiently and may also experience a loss of appetite and decreased food diversity. These conditions may eventually lead to undernutrition and hypometabolism. Masticatory function was evaluated by having the examinees chew a gummy jelly and then evaluating the degree of crushing of the gummy jelly.

The Gluco Sensor GS-II (GC Co.) was used in the masticatory efficiency test using the glucose concentration method. The examinees were instructed to chew a gummy jelly dedicated to the test for 20 seconds, hold 10 mL of water in their mouths, and spit it out together with the gummy jelly. Glucose eluted into the spat water was measured to obtain the masticatory efficiency. Individuals with an eluted glucose level < 100 mg/dL were diagnosed with a decline in masticatory ability.

In the masticatory efficiency test using a masticatory performance score, examinees are instructed to chew a gummy jelly (UHA Mikakuto) 30 times and spit it out. The degree of crushing of the gummy jelly was evaluated and scored using a scoring table. Individuals with a score 2 or less are diagnosed with decreased masticatory function.

7) Decline in swallowing function

Declined swallowing function is a malfunction observed when an age-related decline in swallowing function begins but before dysphagia becomes obvious. The swallowing function was assessed using a questionnaire.

For assessment using the Eating Assessment Tool (EAT-10), examinees scoring three or more were diagnosed with declined swallowing function. For assessment using the Seirei dysphagia screening questionnaire, examinees responding A to any item were diagnosed with declined swallowing function.

Dysphagia should be suspected when a decline in swallowing function is observed. Therefore, conducting a screening test for dysphagia or referring the patient to a specialist is necessary.

Management of oral hypofunction

Figure II-12 shows the morbidity of oral hypofunction based on the data obtained from dental clinics, and Figure II-13 shows the percentage of patients with a decline in oral function for individual test items.

The purpose of these seven test items for diagnosing oral hypofunction was to comprehensively evaluate oral function. Poor oral hygiene (oral uncleanliness) and dry mouth reflect a poor oral environment; decreased occlusal force and tongue/lip motor function reflect poor muscle movement (dexterity) and weakened muscle strength, namely, deterioration of individual oral functions; and decreased masticatory function and swallowing function reflect a deterioration of integrated oral function formed by a combination of individual oral functions.

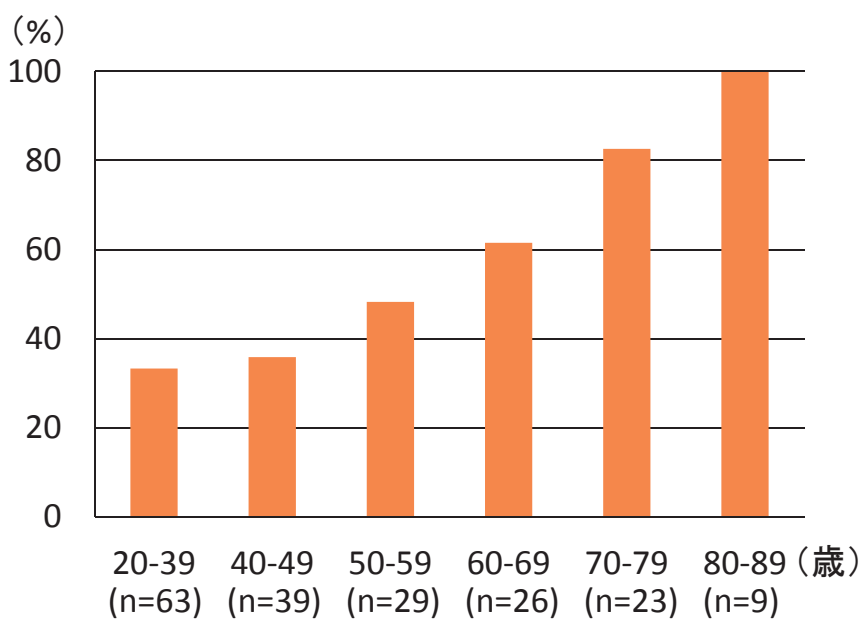


Figure II-12. Morbidity of oral hypofunction based on the data obtained from dental clinics: results of a survey involving 189 adults who visited dental clinics (average age: 51 ±16 years old, males: 83, and females: 106) (partially modified)³⁰⁾

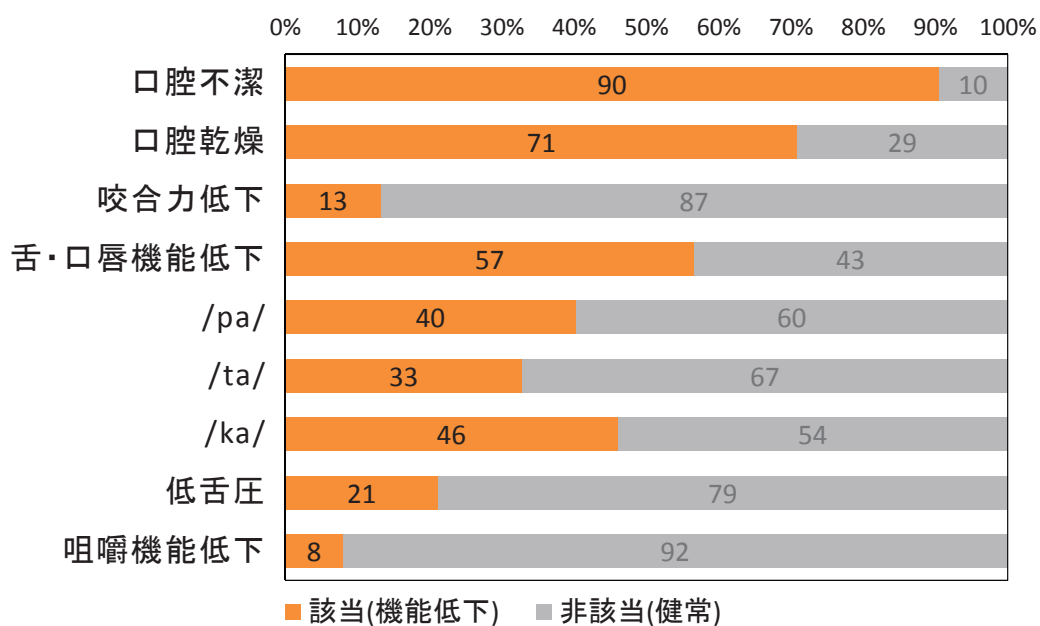


Figure II-13. Percentage of patients showing a functional decline for individual test items: results of a survey involving 189 adults who visited dental clinics (average age: 51 ±16 years old, males: 83, and females: 106). The swallowing function was evaluated using a different method. Since none of the patients manifested declined swallowing function, the item of “declined swallowing function” was excluded from the figure (partially modified)³⁰⁾.

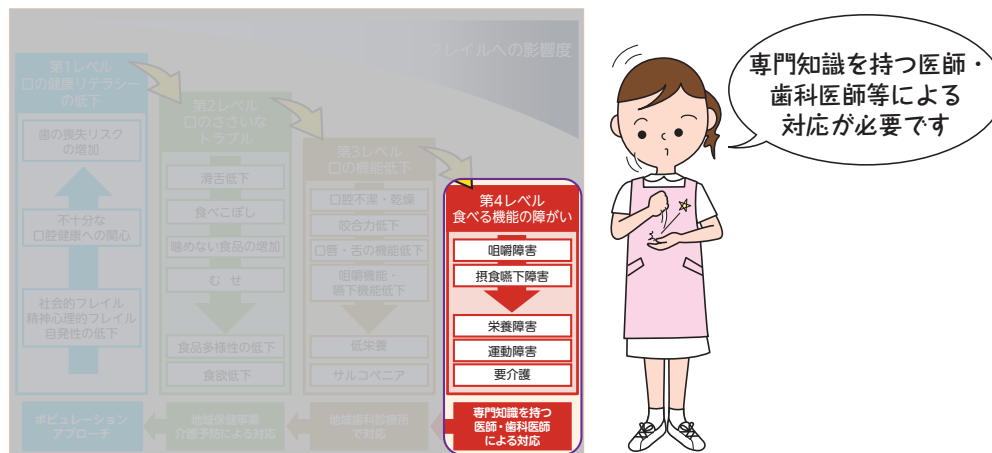
People demonstrating a functional decline in more than three of the seven test items were diagnosed with oral hypofunction. For patients diagnosed with oral hypofunction, a management plan aimed at maintaining and improving oral function is formulated according to the patient's oral condition and test results, and the patient's oral function is managed in accordance with the management plan. After 6 months, the patient was re-evaluated according to the rules of the medical service fee system. When the patient still demonstrated a functional decline in more than three test items at the reevaluation, a management plan was prepared again, and management was continued in accordance with the new management plan.

Functional decline in two or fewer test items indicates a cure for oral hypofunction. Therefore, when a patient demonstrates functional decline for two or fewer test items at reevaluation, the patient's oral function is judged to have been restored. Therefore, the patient's oral function improved after management and is at "the second level." However, although the patient has managed to recover from oral hypofunction and escape from the situation classified as "the third level," continuous management is necessary to prevent the oral function from deteriorating again.

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4) 4th level: Impairment of eating function



1. Impairment of eating function

1) Outcomes of impaired eating function

The oral cavity is an organ involved in various functions, including not only mastication and swallowing but also conversation, speech, and breathing. Therefore, when a functional decline in the oral cavity progresses, mastication, swallowing, and articulatory functions are impaired. Impairments of mastication and swallowing functions obstruct ingestion and prevent sufficient nutritional intake, leading to nutritional disorders and dehydration. People with nutritional deficiency have a decline in systemic immune function. Furthermore, protein intake becomes insufficient, and the strength of all the muscles in the body decreases. Muscle force involved in swallowing also decreases, which further worsens dysphagia. Since body water content in elderly people is less than in young people, they easily develop dehydration. Decreased food and water intake due to dysphagia cause dehydration followed by hypovolemia and electrolyte balance disorder, eventually leading to loss of motivation and disturbance of consciousness.

Severe dysphagia further raises the possibility of aspiration of food and saliva, resulting in aspiration pneumonia and suffocation (Figure II-14). Furthermore, a nutritional disorder resulting from dysphagia worsens muscle weakness in the whole body and causes sarcopenia and difficulty in movement, eventually leading to severe frailty and low independence. The patient finally becomes a person in need of nursing care. Eating food through one's mouth would be a pleasure for people which remains until the last moment of life. Severe dysphagia deprives people of not only the life support function of nutrition intake but also the pleasures of eating food through their mouths. Therefore, severe dysphagia reduces the QOL. As mentioned above, further aggravation of declined oral function causes damage to eating function. Damaged eating function then damages nutritional conditions and motor functions, resulting in reducing the QOL.

Unlike the functional impairments classified as the aforementioned first, second, and third level of impairments, the impairments classified as the "fourth level: impairment of eating function" correspond to functional disorders, which are less reversible. It is critical to detect a functional decline in the oral cavity before eating function is impaired and treat it early to allow people to regain their healthy states.

Concerning a patient with impairment of oral function, the impairment should be assessed and diagnosed appropriately. Based on the results of the assessment and diagnosis, the patient should undergo optimum rehabilitation. These steps would allow the patient not only to enjoy meals depending on his/her disorder level but also to recover his/her loss of muscle force and functions. However, please note that specialized knowledge and skills are frequently required in the assessment and treatment of impaired eating function (dysphagia). Therefore, cooperation among multiple professionals is required.

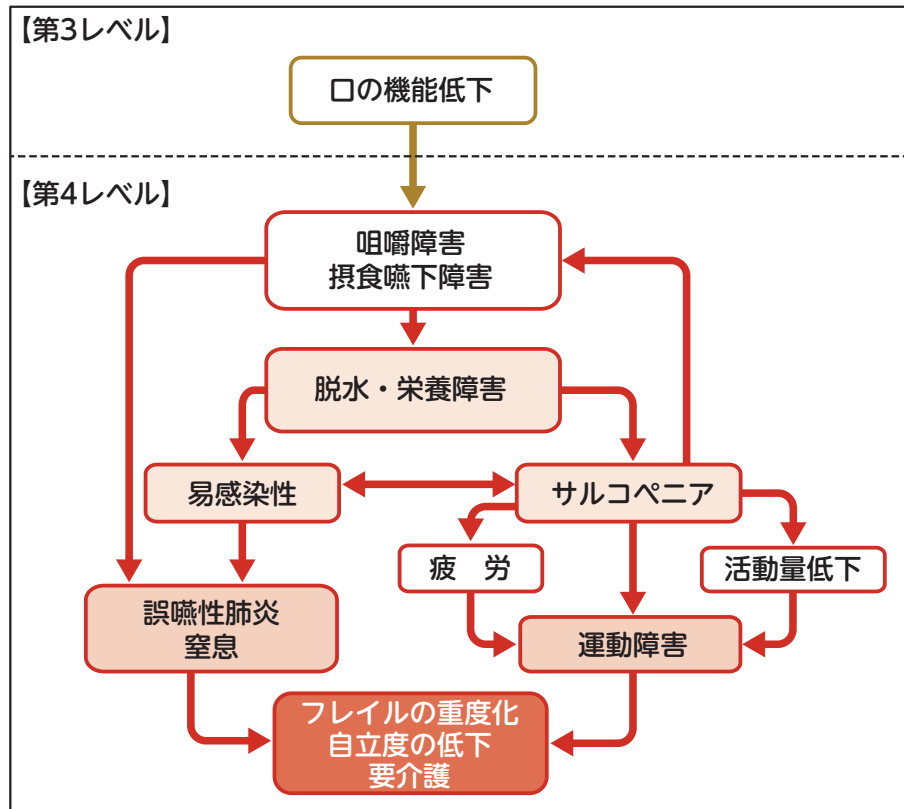


Figure II-14. Schematic diagram showing the pathological progression for the fourth level: declined oral function caused by various factors in the oral cavity reduces the dietary intake. Changes in dietary habits cause undernutrition and nutritional deficiency.

Source: Koichiro Matsuo, Fujita Health University

2) Causes of dysphagia

Declined swallowing function caused by age-related physiological changes and loss in muscle mass in the head and neck due to sarcopenia is called presbyphagia. Presbyphagia can be considered a state of frailty in swallowing and regarded as a previous stage of dysphagia. When presbyphagia is accompanied by other diseases, such as cerebrovascular disease, neurological disease, and dementia, the patient might develop irreversible dysphagia. There are various causes of dysphagia. According to the causes, dysphagia is subclassified as mechanical, structural, and iatrogenic (Figure II-15). During a medical interview, it is essential to check whether the patient has a history of swallowing disorder and whether the patient is receiving drugs that can cause dysphagia.

Mechanical dysphagia is caused by disturbances in the central nervous system, peripheral nervous system, or muscle groups engaged in controlling the swallowing function. Representative diseases that may cause mechanical dysphagia include cerebrovascular and Parkinson's disease. Regarding cerebrovascular diseases, dysphagia is observed in approximately 50% of patients at the acute stage and approximately 10% of those at the chronic stage. Parkinson's disease is one of the neurodegenerative diseases which causes extrapyramidal symptoms because of the degeneration of dopamine-producing cells in the substantia nigra. The symptoms of Parkinson's disease include tremors in the tongue, delay in swallowing reflexes, a decrease in laryngeal elevation, and pharyngeal constriction. Severe dysphagia is also observed in patients with amyotrophic lateral sclerosis (ALS). As ALS progresses, motor neuron degeneration worsens, and muscle atrophy in the oral cavity also becomes significant, leading to the development of severe dysphagia. As a result, many patients with ALS eventually undergo gastrostomy.

機能的障害

- 脳血管障害
- 神経筋疾患（Parkinson 病、筋萎縮性側索硬化症、筋ジストロフィーなど）
- 脳腫瘍、頭部外傷、認知症 など

器質的障害

- 頭頸部腫瘍やその手術、放射線治療後の形態学変化
- 骨棘や憩室、口唇口蓋裂などの先天異常、
- 顎口腔顔面・咽頭内の炎症・外傷

医原性障害

- 抗コリン剤による唾液分泌抑制や食道蠕動障害
- 抗精神病薬や抗パーキンソン薬による舌の不随意運動
- 抗精神病薬、抗不安薬などによる意識レベルの低下など

Figure II-15. Causes of dysphagia

Structural dysphagia is caused by structural abnormalities of organs involved in eating and swallowing. Typical examples are dysphagia caused by head and neck tumors and those observed after treatment of those tumors. Some tumors in the oral and pharyngeal cavities cause dysphagia due to pain and obstruction to the passage of food. In addition, after surgical treatment, defects in the bone and muscle or nerve damage cause dysphagia. Meanwhile, symptoms of dysphagia due to radiation therapy are divided into acute and late symptoms. During radiation therapy, mucositis appears in the oral cavity and pharynx and causes dysphagia because of severe pain. Irradiation to the salivary gland reduces the amount of salivary secretion, causing dysphagia. An obstruction to the passage of food is also observed frequently after radiation therapy because of scar formation at the hypopharynx and pharyngoesophageal segment.

Among various factors causing iatrogenic dysphagia, particular attention should be paid to the side effects of drugs. Many elderly people receive multiple drugs. Symptoms of drug-related dysphagia include dry mouth due to suppression of salivary secretion, motor disability, and disturbed consciousness. Many types of drugs which elderly people receive, such as anticholinergic, antihistamine, antihypertensive, and antipsychotic drugs, have a side effect of dry mouth. Suppression of salivary secretion makes it difficult to form a bolus during meals, increasing difficulty swallowing. Antipsychotic, antiparkinsonian, and anti-anxiety drugs have an impact on neurotransmitters in the central nervous system, thereby, as a side effect, interfering with the motor functions necessary for eating and swallowing. Antipsychotic and anti-anxiety drugs cause disturbed consciousness and affect swallowing function. Recently, since the number of generic drugs has increased, remembering drug names has increasingly become challenging. Against such a background, checking the prescription record book is indispensable.

2. Assessment of impaired eating function

Dysphagia often progresses without being noticed by patients and their family members or caregivers. Therefore, it is essential to notice the presence of dysphagia before symptoms become serious. Regarding a patient who regularly visits a dental clinic or undergoes dental service at home, information about changes in weight and nutrition intake and the presence of choking or difficulty in eating are collected through interviews from a clinical viewpoint. If necessary, a simple screening test is performed. When dysphagia is suspected, an examination is performed by specialists, such as video-endoscopy (VE) and video-fluorography (VF).

1) Observations of patients during meals and screening test

Observing patients during eating is essential for the evaluation of eating function. During the observation, attention should be paid to the kind of food, posture, necessity of assistance during the meal, and presence of choking or wet hoarseness. When dysphagia is suspected, the severity is evaluated using the 10-item Eating Assessment Tool (EAT-10), a simple questionnaire, or a screening test (refer to Part III: Assessment of oral frailty).

2) Nutritional assessment

Dysphagia causes nutritional deficiency. Patients with nutritional deficiency are more likely to contract infectious diseases and develop a state of requiring nursing care due to muscle weakness. Therefore, nutritional assessment of patients with dysphagia is essential to prevent complications (refer to Part III: Assessment of oral frailty).

3) Cooperation with specialists

Since specialized knowledge and skills are required for the evaluation and treatment of dysphagia, general dental clinics should cooperate with medical facilities specializing in dysphagia. The dysphagia-related medical resource map is useful for searching for medical facilities specializing in dysphagia (<http://www.swallowing.link/greeting>). The Japanese Society of Gerodontology has established a certification system for dentists specialized in dysphagia rehabilitation. Please visit the society website (http://www.gerodontology.jp/doctors/dysphagia_specialist/) for the society-certified dentists specialized in dysphagia rehabilitation.

Even if treating patients with dysphagia is challenging, supporting patients with impaired eating function through cooperation with specialists, attending physicians, speech-language pathologists, nurses, and care managers will be effective.

3. Management of impaired eating function

Depending on the cause of the impairment, patients with impaired eating function can recover through rehabilitation appropriate for them. Appropriate nutrition management and training will allow the patients to eat meals safely (Figure II-14). Management of impaired eating function includes rehabilitation aimed at functional recovery, compensatory treatment such as adjusting the posture and introducing a dysphagia diet, application of an oral prosthesis (palatal augmentation prosthesis or PAP), and oral health care.

Rehabilitation for patients with impaired eating function is divided into indirect and direct approaches. An indirect approach is an exercise method (indirect exercise) to indirectly train the swallowing function without using food. In contrast, in the direct approach (direct exercise), the swallowing function is trained by actually using food. The indirect exercise can eliminate the risk of food aspiration because patients are able to train their swallowing functions without actually swallowing food. Therefore, indirect exercise is also applicable to people with severe dysphagia. However, since patients are required to carry out the exercise alone, the indirect exercise is inapplicable to patients with declined cognitive function or those unable to follow the trainer's instructions. On the other hand, direct exercise generally aims to allow patients to eat meals safely by compensating for impaired eating function through adjustment of posture during meals and modification of food style. For more details, please visit the website provided by the Japanese Society of Dysphagia Rehabilitation (https://www.jsdr.or.jp/doc/doc_manual1.html)³¹⁾.

1) Indirect approach

Many patients with dysphagia have muscular weakness in their heads and necks. Representative muscle training programs for improving swallowing function are shown here. The training frequency and number of sets and repetitions are adjusted according to the patient's fatigue level. Training is carried out 3 times a week with 1 set of 10 to 30 repetitions.

- (a) Head lift exercise: This exercise aims to strengthen the suprahyoid muscles, which are essential for larynx elevation while swallowing^{32, 33)}. A patient is instructed to lift his/her head while lowering his/her chin in a supine position without raising his/her shoulder. The exercise starts with as many repetitions as possible, and the number of repetitions gradually increases (Figure II-16).
- (b) Tongue strengthening exercise: The tongue, which is a mass of muscle, plays a major role in the act of eating. Tongue strengthening exercises can improve swallowing function and reduce the risk of aspiration^{34, 35)}. As an exercise method generally applied, a larger piece of cotton swab or a training device is placed between the tongue and the palate. The patient is instructed to elevate his/her tongue to press his/her tongue against the cotton swab or device. The JMS Tongue Pressure Measurement Device (JMS Co., Ltd.) enables exercise based on quantitative data (refer to Part III: Assessment of oral frailty).

2) Direct approach

Many exercises categorized as the direct exercise take compensatory strategies through adjustment of posture and modification of food style, with the aim of allowing patients to eat safely. Eating is an optimum exercise for the improvement of eating function. However, direct exercises require risk management to prevent food aspiration and suffocation because they use actual food. A pulse oximetry during direct exercises is used to monitor the respiratory system. When a decrease in oxygen saturation and shallow breaths are observed, the patient is instructed to stop eating, and the patient's condition is checked. If the patient continues coughing, the patient is assisted to expel phlegm. During direct exercises and feeding assistance, attention should be paid to the posture, speed of eating, and food volume per mouthful to prevent aspiration and suffocation. The patient is asked to utter a voice after swallowing to check for post-swallowing residue in the pharynx. If residue remains in the pharynx or larynx, wet hoarseness is observed. When wet hoarseness is observed, the patient is instructed to take a jelly food product or thickened water (alternate swallowing method). This method facilitates clearance of post-swallowing pharyngeal residue. Taking countermeasures immediately is crucial in adverse events, such as aspiration and suffocation.

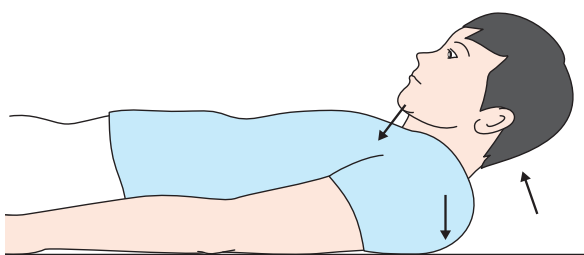


Figure II-16. Head lift exercise



Figure II-17. Reclining position

Taking a stable posture is essential to eat meals safely. As a representative method for posture adjustment, a reclined position is generally applied (adjustment of trunk flexion angle). When observing poor bolus transportation from the oral cavity to the pharynx, the patient's trunk is bent rearwards to utilize the gravity support to facilitate bolus transportation (Figure II-17). However, when the head is bent rearwards along with the trunk, the suprahyoid muscles are stretched, which may promote aspiration. Therefore, when patients take a reclining position, a pillow is placed behind their heads to support their head parts (Figure II-17). Modification of food style and adjustment of solution thickness are essential to prevent aspiration. In many cases, a slight adjustment of posture and solution thickness can prevent aspiration and secure safe food intake. The data obtained from the previously mentioned screening test and VE/VF contribute toward providing advice on a food style and eating posture optimum for individual patients.

3) Palatal augmentation prosthesis (PAP)

Patients who underwent tongue cancer surgery or those with cerebrovascular, Parkinson's, or other diseases tend to develop structural and functional tongue disorders. PAP, a device applicable to patients with a glossal movement disorder, is used to improve symptoms of articulatory disorder and dysphagia by augmenting the volume of the palate (Figure II-18).



Figure II-18. Palatal augmentation prosthesis (PAP)

PAP is applicable to patients who underwent tongue cancer surgery or those with various diseases. This device augments the volume of the palate and supports the contact between the tongue and the palate.

Summary

As oral frailty progresses, various functional disorders appear, eventually leading to impaired eating function (the fourth level). Disorders observed at the fourth level are less reversible than those at the other three levels ranging from the first to the third. However, patients with oral frailty at the fourth level will be able to recover their lost functions and enjoy meals safely if their pathological conditions are evaluated correctly, and they undergo rehabilitation optimum for them. On the other hand, many patients with oral frailty at the fourth level have not only severe dysphagia but also severe underlying diseases and decreased activities of daily living. Therefore, knowledge of systemic diseases, professional skills, and cooperation among professionals and specialists are indispensable to treating those patients.

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