

Effect of dentist's clinical experience on treatment satisfaction of a complete denture

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SUMMARY The relationship between the prosthodontic experience of dentists and satisfaction of complete denture wearers remains unknown. To investigate whether a prosthodontist's clinical experience affects treatment satisfaction of a complete denture wearer. From April 2004 to July 2006, we conducted a randomised controlled trial at two centres, including 74 edentulous patients; of these, 32 and 30 were randomly allocated to the ED or ID group, respectively. All the patients rated their satisfaction with dentures, including general satisfaction and satisfaction of chewing ability, speaking, cleaning, stability, retention, comfort and aesthetics. These satisfaction ratings were measured by a 100-mm visual analog scale (VAS). Perceived chewing ability to foods, divided into five grades, was measured using a questionnaire. The mastication index (MI) was calculated for each grade. General satisfaction and satisfaction of speaking,

stability and retention were significantly higher in the ED than in the ID group ($P = 0.049, 0.003, 0.019$ and 0.041 , respectively). No significant difference existed between the MI of the ED (71.3 ± 18.4) and ID group (64.1 ± 16.53). However, the perceived chewing ability of grade 5 food, whose texture was the hardest among all the grades, was significantly higher in the ED group than in the ID group. Within its limitations, this study showed that a clinician's prosthodontic experience affects a complete denture wearer's satisfaction ratings.

KEYWORDS: complete denture, edentulous patient, satisfaction rating, randomised controlled trial, prosthodontic experience, visual analog scale

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Introduction

A patient undergoing surgery must be aware of the surgeon's surgical experience, because surgical experience affects treatment results. Several studies have shown that mortality rates vary widely across hospitals and that the survival rate of patients undergoing cardiac, brain or cancer surgeries depends on the institution where the surgery is performed and the experience of the operating surgeon (1–5). Therefore, studies investigating the relationship between treatment outcomes and surgical experience are socially significant.

Several clinicians and patients believe that the success of dental treatment is also affected by the experience of a dentist. Evans *et al.* (6) investigated

whether patient-centred scores after the removal of a third mandibular molar correlated with the experience of the surgeon; his study showed no significant correlation between the treatment outcomes and the experience of the surgeon. Guéders and Geerts investigated the influence of operator experience on microleakage in class V composite restorations and concluded that the experience of the operator has a significant influence on microleakage (7). A randomised controlled trial revealed that the number of complete denture adjustments required after denture delivery is more in the case of junior clinicians than in the case of senior clinicians (5). These reports suggest that certain dental treatments are affected by the dentist's experience.

Do experienced dentists (ED) provide more treatment satisfaction to edentulous patients wearing a complete denture than do inexperienced dentists (ID)? Occasionally, the high-quality complete dentures provided by ED may not lead to patient satisfaction; therefore, it is difficult to evaluate the significance of experience in the field of denture treatment. However, the relationship between patient satisfaction with dentures and a dentist's experience is unclear because patient satisfaction depends on multiple factors such as denture quality (8–10). This may be further understood on the basis of Carlsson's suggestion that patient-centred outcome scores are affected by not only dentists' technical skills but also patient-related psychological and emotional factors (11). Several studies have investigated denture functions and patient satisfaction ratings (12, 13); however, to our knowledge, no study has investigated the relationship between the prosthodontic experience of dentists and satisfaction of complete denture wearers.

Therefore, we conducted this study to determine whether clinicians' experience of complete denture treatment affected the satisfaction ratings of complete denture wearers. The null hypothesis was that no difference existed in the satisfaction ratings between complete denture wearers treated by ED with over 10 years of experience who were also certified by the Japan Prosthodontic Society and those treated by ID with <3 years of experience.

Materials and methods

Study design and participants

This randomised controlled parallel clinical trial recruited edentulous patients from Nihon University School of Dentistry at Matsudo Affiliated Hospital and Kanagawa Dental College Affiliated Hospital between 15 April 2004 and 20 July 2006. The recruitment was originally held for a previous study that investigated differences in clinical outcomes between patients who wear complete dentures with a conventional acrylic resin (CAR) and those who wear complete dentures with an acrylic-based resilient denture liner (ARL) (14–16). The permuted block method, which was used for allocation in that study, could randomise recruited patients into either the ED or ID group, with parallel allocation into either the ARL or CAR group. In this study, the per-

mutated block method could simultaneously allocate a pair of clinician type (ID or ED) and denture-base type (ARL or CAR) in the following four patterns: denture with CAR by ED, that with CAR by ID, that with ARL by ED and that with ARL by ID (14). As these four patterns could exist in 24 different permutations ($4 \times 3 \times 2 \times 1 = 24$), the random number table consisted of 24 numbers, and one of the 24 numbers was randomly selected for allocation. Each random number represented four combinations of clinician and denture-base type, which was called a 'block'. As each block comprised four combinations with equal number of clinician and denture-base type, one block was available for four participants; this ensured a balance in clinician and denture-base type. Following allocation to four participants, the next block was selected according to the random number table. Consequently, blocking ensured a nearly numeric balance for each type of treatment and clinician at any given time during the study. After block randomisation, the number of participants for each type of denture base and clinician was equalised. One computer-generated random number table each was prepared for Nihon University School of Dentistry at Matsudo Affiliated Hospital and Kanagawa Dental College Affiliated Hospital. In this study, we analysed the differences between the ED and ID groups to determine the effect of dentists' experience of complete denture treatment on the satisfaction rating of complete denture wearers.

The participants were recruited regardless of their gender, age, adaptive or maladaptive experience while wearing mandibular hard dentures, and the height of the alveolar ridge, which was measured on a panoramic radiograph and was classified according to the system of the American College of Prosthodontists (17). Patients were not included in the study if they met either one of the following two exclusion criteria: (i) lack of physical strength to participate in the trial due to systemic disease and/or ageing and (ii) lack of understanding of written or spoken Japanese. Each patient received oral and written information about the study.

Sample size calculation

The appropriate sample size was estimated using the general satisfaction rating as the primary outcome for

this trial. A between-group difference of 10 mm on the 100-mm visual analog scale (VAS) ratings of general satisfaction during the initial adjustment session was sought, using a variance of 15 mm for ARL and 10 mm for CAR, based on the data obtained from a previous study (18). To fulfil the criteria of 80% power with a two-sided alpha level of 5% and to factor in potential participant dropouts, 74 subjects were enrolled in this study.

Measurement outcomes

Baseline characteristics. The assessors noted the baseline characteristics of the patients, such as gender, age, edentulous period, age of existing denture, number of previous dentures and height of the alveolar ridge. Based on the classification of complete edentulism, as specified by the American College of Prosthodontists, the heights of the alveolar ridges of the mandibles were measured on the radiograph at the least vertical height portion of the mandibles, so as to minimise any variations while measuring using the radiographic techniques (17).

Patients' satisfaction ratings to dentures. Patients' satisfaction ratings to dentures were measured by the 100-mm VAS. The general satisfaction and satisfaction with respect to denture functions such as chewing ability, speaking, cleaning, stability, retention, comfort and aesthetics were measured. The left-side anchor on the VAS of satisfaction ratings was 'not at all satisfied', and the right-side anchor was 'extremely satisfied'.

Perceived chewing ability to foods. A valid questionnaire developed by Hirai *et al.* (19) was used for assessing the perceived chewing ability. Each of the 35 foods listed in the questionnaire (Table 1) was assessed by participants as per the following criteria: 0 = cannot eat; 1 = can eat with difficulty and 2 = can eat easily. If participants had no will to eat the listed food, the foods were assessed as score 0. The 35 foods were categorised into grades between 1 and 5, in the order of increasing food hardness. Food in the same grade had similar rheological texture. The total score of each grade was substituted in the following equation to calculate the mastication score (MI): $MI = \{[(\text{grade } 1 \times 1) + (\text{grade } 2 \times 1.14) + (\text{grade } 3 \times 1.30) + (\text{grade } 4 \times 1.52)] \times 100\} / 111.4$. The

Table 1. Foods in each grade

Grade	Foods
1	Pudding, bananas, boiled cabbage, boiled carrots, boiled taro, sliced raw tuna, boiled onion
2	Strawberries, ham, boiled chicken, boiled fishpaste patty, konnyaku, boiled kombu (tsukudani kombu), raw cabbage
3	Fried chicken, fried rice cracker, roasted chicken, apples, pickled eggplant, boiled beef, raw cabbage
4	Roasted pork, pickled scallion, pickled radish, rice cake, peanuts, sliced raw cuttlefish, pork cutlett
5	Raw carrots, takuwan, jellyfish, vinegared octopus, raw trepang, rawabalone, dried cuttlefish

Taro = Japanese taro potato; konnyaku = a paste made from starch of the devil's tongue plant; kombu = tangle weed; takuwan = deeply pickled radish; trepans = see cucumber.

coefficient for each grade was used for weighting to adjust the food texture.

Schedule for measurement of outcomes. The outcomes were measured 2 months after the completion of the denture adjustments. Based on the patients' complaints after denture delivery, the dentists decided when denture adjustment was completed.

Complete denture laboratory procedures

The dentures at each centre were fabricated by a dental technician in the dental laboratory of the centre. The following bilaterally balanced occlusal scheme was applied for the new dentures: the functional maxillary lingual cusps of the posterior teeth were set in the central groove of the mandibular teeth, and the maxillary buccal cusps were kept in contact with the mandibular buccal cusps. The buccal cusps and the lingual cusps were in articulation and functional in the bilateral and protrusive excursions. The teeth were arranged using the 20-degree semi-anatomical commercial teeth (Duracross*);. The artificial teeth were arranged along an alveolar ridge such that the buccal cusp tip of the first premolar and the central fossae of the posterior teeth lay directly over the line describing the alveolar ridge crest (which can be approximated by the line joining the mandibular cuspid cusp tip to the medio-lateral centre of the retrom-

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olar pad). The dentists were allowed to rearrange the teeth on the wax denture at the trial session if necessary.

Mandibular complete dentures for the CAR group were constructed using conventional heat-activated acrylic resin only (Physio Resin*); those for the ARL group were constructed using conventional heat-activated acrylic resin and a constructed 2-mm-thick permanent ARL (Physio Soft Rebase*). Participants of both groups wore conventional maxillary complete dentures using conventional heat-activated acrylic resin. The Physio Soft Rebase consisted of a polyethylmethacrylate powder, a non-phthalate plasticizer liquid and methacrylate ester derivatives. Maxillary complete dentures were also fabricated using heat-activated acrylic denture resin. According to the manufacturer's instructions, conventional dough-stage heat-activated acrylic denture-base resin was packed against the master cast, which was covered with a 2-mm spacer. After removing the spacer, the resilient lining material in the dough stage was inserted to replace the spacer. The resin was then compression-moulded and processed. The curing cycle was as follows: 90 min at 70 °C followed by 30 min at 100 °C.

Statistical analysis

The baseline characteristics of the participants in the ID and ED groups were compared by the *t*-test and chi-square test. The *t*-test was used to compare the satisfaction ratings and perceived chewing ability between the ID and ED groups. *P* < 0.05 was considered to indicate statistical significance.

Results

Baseline characteristics

Seventy-four patients (mean age, 53.89 years) who had been consecutively sampled were randomised for this trial. The random permuted block within strata method assigned a nearly equal number of participants to both the groups: 36 to the ID group and 38 to the ED group, as well as, 37 to the CAR group and 37 to the ARL group. Table 2 provides the baseline characteristics of the 74 subjects. No significant differences were observed in any of the baseline characteristics between the ID and ED groups (*P* > 0.05, Student's *t*-test and chi-square test). Figure 1 shows

Table 2. Baseline characteristics

Characteristics	ID group	ED group
Age (year)	74.9 ± 7.5	72.9 ± 7.7
Gender (male/female)	18/18	19/19
Edentulous period (year)	14.4 ± 8.9	12.3 ± 10.4
Age of maxillary existing dentures (year)	8.2 ± 6.9	8.08 ± 9.2
Age of mandibular existing dentures (year)	7.3 ± 5.4	7.0 ± 9.2
No. of previous maxillary dentures	2.0 ± 1.2	1.2 ± 1.6
No. of previous mandibular dentures	2.0 ± 1.9	2.3 ± 1.6
Height of alveolar ridge (mm)	18.3 ± 5.7	18.0 ± 5.8
Satisfaction ratings to old denture		
General satisfaction	46.2 ± 24.3	47.6 ± 31.5
Satisfaction of chewing	47.7 ± 33.5	53.2 ± 30.8
Satisfaction of speaking	51.2 ± 28.1	54.1 ± 30.9
Satisfaction of cleaning	75.9 ± 21.8	70.5 ± 27.3
Satisfaction of stability	48.6 ± 29.4	54.4 ± 29.9
Satisfaction of retention	49.3 ± 27.5	50.4 ± 31.7
Satisfaction of comfort	47.9 ± 28.6	47.7 ± 32.5
Satisfaction of aesthetics	60.3 ± 31.0	55.7 ± 31.3

ID groups = Participants treated by inexperienced dentist.
 ED group = Participants treated by experienced dentist.
 There are no significant differences between ID and ED groups.

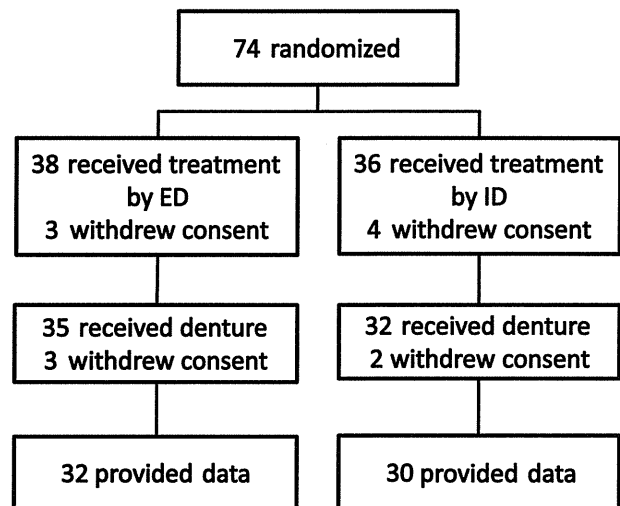


Fig. 1. Flowchart showing the course of the participants in the study. The participants' follow-up ratios of the experienced dentists (ED) and inexperienced dentists (ID) groups are 84.2% and 83.3%, respectively. These 12 participants withdrew from the trial due to unwillingness to complete the trial.

the course of the participants in this study. Of the 74 allocated subjects, 62 completed the trial, whereas 12 did not. These 12 participants withdrew from the trial due to loss of willingness to complete the trial.

Furthermore, of the 74 participants, Nihon University and Kanagawa Dental College recruited 54 participants (27 to ID, 27 to ED) and 20 participants (10 to ID, 10 to ED), respectively. There were no differences between the baselines characteristics of the participants recruited at these two hospitals ($P > 0.05$).

Patients' satisfaction ratings

The satisfaction ratings of the ED group were higher than those of ID group, and the general satisfaction, satisfaction of speaking, satisfaction of stability and satisfaction of retention were significantly different between the ED and ID groups (Fig. 2, $P = 0.049$, 0.003 , 0.019 and 0.041 , respectively). The ID group had higher coefficients of variation (CV) in satisfaction ratings than the ED group had, which implies that the satisfaction ratings of the ID group varied more widely across patients than did the ratings of the ED group (Table 3). Furthermore, no differences existed between the satisfaction ratings provided by the participants of the two hospitals ($P > 0.05$).

Perceived chewing ability

The MI of the ED group (71.3 ± 18.4) was not significantly different from that of the ID group (64.1 ± 16.53). No significant difference in chewing foods was observed in grades 1, 2, 3 and 4; however, perceived chewing ability with respect to grade 5 foods, whose texture was the hardest among all the grades, was significantly different between the ED

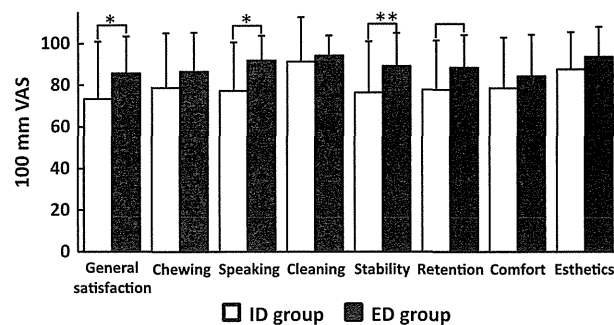


Fig. 2. Satisfaction ratings provided by the participants. Inexperienced dentists (ID) group, participants treated by an inexperienced dentist. Experienced dentists group (ED), participants treated by an experienced dentist. The asterisk (*) represents statistical significance. General satisfaction, satisfaction of speaking, satisfaction of stability and satisfaction of retention were significantly different between the ID and ED groups.

Table 3. Coefficient of variation on satisfaction ratings in the two groups

	ID group	ED group
General satisfaction	37.0	21.2
Satisfaction of chewing	32.8	21.7
Satisfaction of speaking	30.0	13.0
Satisfaction of cleaning	22.8	10.2
Satisfaction of stability	31.5	17.7
Satisfaction of retention	30.0	17.7
Satisfaction of comfort	30.8	23.5
Satisfaction of aesthetics	20.2	15.3

ID group = Participants treated by inexperienced dentist.

ED groups = Participants treated by experienced dentist.

and ID groups (Fig. 3, $P = 0.048$). Furthermore, no difference in MI was found between the participants of the two hospitals ($P > 0.05$).

Discussion

In this study compared with complete denture wearers in the ID group, those in the ED group showed higher overall satisfaction ratings, especially with respect to general satisfaction and satisfaction of speaking, stability and retention. These results suggest that the prosthodontic experience of a clinician affects the satisfaction ratings of complete denture wearers. The baseline characteristics of the two groups showed homogeneity, suggesting that the randomisation was properly performed and that the results of this randomised controlled clinical trial are valid. To our knowledge, this is the first study to examine the effects of a

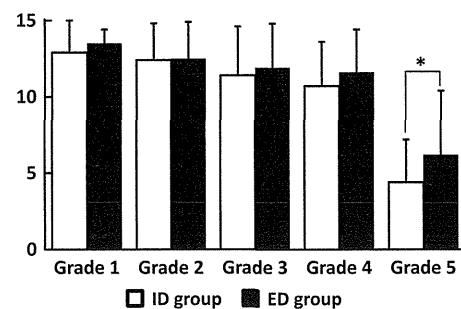


Fig. 3. Perceived chewing ability of the participants. Inexperienced dentists (ID) group, participants treated by an inexperienced dentist. Experienced dentists group, participants treated by an experienced dentist. The asterisk (*) represents statistical significance. Chewing ability with regard to grade 5 foods was significantly different between the inexperienced dentists (ID) and experienced dentists (ED) groups.

dentist's prosthodontic skills on the satisfaction ratings of a denture wearer.

What caused the differences in the satisfaction ratings between the ID and ED groups? Considering that this study was designed as a randomised controlled clinical trial to control any bias, the only difference between the groups was dentist skills, that is, a dentist's communication skills; technical skills with regard to denture procedures such as taking impression, assessing jaw relationship and adjusting dentures; and skills to evaluate denture-related complaints of edentulous patients and the denture itself. Analysis of the CV value revealed that the ED were highly skilled. The CV value, which is calculated by dividing the standard deviation by the mean of the sample, can show a range of variation in the satisfaction ratings of each item. The CV value of all the satisfaction ratings in the ED group showed narrower variations than that in the ID group (see Table 3). The narrow variation may imply that ED who are highly experienced in prosthodontic techniques have the required knowledge of prosthodontics to consistently satisfy any type of patient, at least on an average level. Patients who are difficult to treat should thus be consulted by ED or prosthodontists; patients who are easy to treat can be easily satisfied, irrespective of the experience of the dentist.

Among the denture functions, satisfaction ratings of speaking, stability and retention were significantly affected by the dentist's prosthodontic experience. The stability and retention of a denture are mainly affected by the base form of a denture, which depends on the impression taken by the dentist (20). However, it is very difficult to master the procedure of obtaining an impression. We previously investigated the difficulty of the impression procedure and reported the time taken by the ID and ED (same as those in the current study) for a final impression; due to their novice border moulding technique, ID were found to spend more chair time to obtain a final impression than were the ED (5). This result suggests that the impression procedure is not only one of the most difficult steps to master for dentists but also one of the most remarkable procedures that could differentiate the skills of ED from those of ID. The difficulty faced by ID in acquiring an impression might explain why the satisfaction ratings of stability and retention were significantly affected by a dentist's prosthodontic experience. With regard to speaking, proper retention

and stability of a denture are essential for complete denture wearers to speak fluently (21). Thus, it is conceivable that the satisfaction rating of speaking was affected by the dentist's prosthodontic experience. Surprisingly, it has been reported that due to the difficulty of the border moulding technique, several clinicians employ a simpler impression method in their private practices instead of the impression method taught during their graduate course (22). Educators, however, recognise the profound effect of the impression-taking procedure on treatment satisfaction of complete denture wearers and continue to teach their students the border moulding technique, even though the procedure is difficult to master.

The chewing satisfaction rating and the MI score of the ID group were not different from those of the ED group. Interestingly, however, a detailed analysis of food consumed in each grade revealed the different dietary characteristics of complete denture wearers treated by ED. Although there was no difference in dietary intake with regard to grades 1, 2, 3 and 4 between the 2 groups, complete denture wearers in the ED group consumed grade 5 food with more ease than did those in the ID group. Grade 5 contained the hardest foods among all the grades. Considering that hard food is more difficult to eat, ED appear to provide high-quality dentures suited to hard foods, even though complete denture wearers are not aware of the potential ability of chewing as a satisfaction measure. It has been reported that complete denture quality does not influence masticatory efficiency (23) or that edentulous subjects dissatisfied with their existing mandibular complete dentures reported significantly better chewing ability after receiving an implant over their dentures due to improved denture quality (24). The effect of denture quality on mastication is a subject of much controversy. The varied results obtained between chewing satisfaction rating and grade 5 food intake revealed an aspect of the controversy observed in perceived chewing ability and denture quality, thereby suggesting that the effect of denture quality on mastication depends upon what is measured as the final outcome.

The differences in satisfaction ratings of denture cleaning, aesthetics and comfort were not statistically significant between the two groups, although these satisfaction ratings were higher in the ED group than in the ID group. This may be due to the following: first, the rating may be affected by factors other than

the dentist factor such as the patient's own ability to clean dentures and the dental technicians' ability to arrange aesthetically appealing artificial teeth; second, the sample size was small for these three ratings. If the sample size were bigger than that used for this trial, it is possible that statistically significant differences between the two groups would be detected in the ratings of chewing, cleaning, comfort and aesthetics. However, the sample size was originally calculated to study the effects of denture-base material on the satisfaction ratings of complete denture wearers and not to study the effects of clinicians' experience on complete denture wearers' satisfaction ratings. Therefore, further studies that focus on clinicians' experience are warranted.

Conclusion

Within the limitations of the current study, we found that the prosthodontic experience of a clinician affected the satisfaction ratings of a complete denture wearer.

Disclosure/Acknowledgments

This study has been conducted in accordance with the Declaration of Helsinki, and each subject received oral and written information about the study and provided informed consent. The study protocol was reviewed and approved by the Human Ethics Committees of Nihon University School of Dentistry at Matsudo (EC 02-036) and Kanagawa Dental College (#19). This study was supported by a Grant-in-Aid for Scientific Research (C19592262) from the Ministry of Education, Culture, Sports, Science and Technology, Japan. There are no conflict of interests to declare.

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Clinical Report

Activities and Actual Achievements of Respiratory Support Team at Showa University Hospital: Report of Activities in the Year 2012

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Abstract: In this study, the contents of the Respiratory Support Team (RST)'s activities, present status of the activities, and oral health problems were evaluated to standardize the management of patients using ventilators at Showa University Hospital. The RST consisted of medical doctors, nurses, medical engineers, physiotherapists, dentists, and dental hygienists. The aim of the team was to standardize the management methods of ventilators and promote early weaning from ventilators. Between April 2011 and March 2012, the RST performed interventions for a total of 184 inpatients. The number of interventions was highest for respiratory medicine, followed in order by gastrointestinal medicine, hematology, cranial nerve surgery, and cardiovascular surgery. During rounds and in training sessions, the members of the RST explained and demonstrated the management of ventilators and facemasks to the staffs of wards where ventilators were used. The results indicated that the management methods of ventilators at Showa University were partially standardized through knowledge transmission from the members of the RST to the staffs of the wards. Moreover, since the dental professionals participated in the RST, the ward staff had opportunities to improve methods of oral hygiene management. However, some future recommendations were provided on indication sheets that varied according to the type of ventilator, and there was no standardization in terms of ventilator settings and facemask selection.

Key words: respiratory support, team medical care, standardization of care.

In inpatients with perioperative or severe respiratory diseases, respiratory care using a ventilator is often performed.^{1~3)} In such patients, when remission of the underlying disease or improvement in the respiratory state is observed, the rapid withdrawal of mechanical ventilation is necessary. However, premature withdrawal induces aggravation of the respiratory state, sometimes

resulting in re-intubation. Conversely, delayed withdrawal increases the hospitalization period and risk of disuse atrophy of the respiratory muscles, mechanical ventilation-associated pneumonia, and airway injury. Therefore, ventilator withdrawal at the appropriate time is considered important. In addition, many medical device-related accidents involving ventilators have

been reported, and thus some standardized ventilator management methods, in the form of guidelines, should be established.⁴⁾

At Showa University Hospital and its Higashi Branch, to standardize ventilator-associated care in wards, a review by a respiratory support team (RST) was initiated in 2002 to analyze inpatients using a ventilator and confirm the management of ventilators. Subsequently, an RST fee was established by a revision to remuneration guidelines for medical care services in 2010. Based on the rules of health insurance treatment, we determined the activities for the team. Additional requirements included medical care through cooperation among physicians and nurses experienced in mechanical ventilation, medical engineers experienced in ventilator maintenance and inspection, and physical therapists experienced in respiratory rehabilitation, but did not include the participation of dental professionals. However, at our hospital, to improve the quality of medical care, dentists and dental hygienists were later included in the management committee and the RST. The importance of oral hygiene management has been recognized and a decrease in the incidence of oral infections, including VAP, by specialized oral hygiene management by dental care professionals has been reported. Therefore, it is considered that dental professionals contribute to the improvement of oral hygiene and reduction of VAP onset.

In this study, to standardize the management of patients using ventilators at the hospital, the contents of the RST's activities, present status of activities, and oral health problems were evaluated.

Materials and Methods

The RST made its rounds every Friday afternoon in inpatient wards on the 6-16th floors, A/B wards of the central ward on the 8th floor, A/general medical care wards of the central ward on the 9th floor, and the ward of the Higashi Branch; in all these wards, the RST fee was covered by public health insurance. Oral health care was performed 3 or 4 times a day in these wards using commercial toothbrushes and mouth swabs. Prior to the


ID		RST indication sheet	
		Date	Time
		Ward	Room
		Name	
		Beginning of use of MV	
		Type of MV	VELA·Servo900·NewPortE200
			EvitaXL·()
Setting: Mode [] FIO2 []			
Condition setting: [Vr PC [] PS PEEP]			
Patient status: Diagnosis: (Primary disease:)			
PaO2/FiO2 []			
Sedation · analgesia: absence · presence name of sedative []			
MD (anesthetist:) (respiratory physician:)			
Nc Certified critical care:) (certified emergency nursing:)			
DDS () DH () ME () PT ()			
X-ray and CT finding			
[]			
Condition of sedation: adequate · inadequate · other()			
Setting of MV: adequacy			
inadequacy → []			
Weaning possible impossible			
Nutrient status: calorie intake Kcal, recommended calorie Kcal			
adequacy inadequacy →()			
Postural drainage: adequate · inadequate →()			
Depressurization: adequate · inadequate →()			
Ambulation: adequate · inadequate →()			
Oral condition: good poor (region:)			
Mobile tooth: absence presence (region:)			
Tooth brushing: adequate · inadequate →()			
Setting of MV: adequate · inadequate →()			
Line, incubator and humidifier: adequate · inadequate →()			
Thoracoabdominal extensibility: good poor ()			
Hypertonic auxiliary breathing muscles absence presence ()			
Range of joint motion: good poor ()			
Rehabilitation status intervention of PT: presence · absence ()			
Attending doctor []			
Comment []			

Fig. 1 RST indication sheet.

Table 1 RST team members.

Profession	Affiliation
Medical doctor	Anesthesiology (advising doctor or certified doctor)
Certified nurse in intensive care	Nursing Department Digestive Center Ward Respiratory Center Ward
Medical engineer	Department of Medical Engineering
Dentist	Oral Health Care Center
Dental hygienist	Department of Dentistry
Physiotherapist	Rehabilitation Center

RST's rounds, the Department of Medical Engineering confirmed the status of ventilator use in the hospital, and informed the members of the team. Between April 2011 and March 2012, the RST performed interventions for a total of 184 inpatients in the general wards of our university hospital.

At the time of rounds, indication sheets were used, and each team member evaluated items in their charge by confirming medical records and through patient examinations. An indication sheet is shown in Fig.



Fig. 2 Status of RST rounds.

Table 2 Procedures of RST rounds.

1	RST indication sheets are produced by the Department of Dentistry.
2	Medical records and examination findings are referenced at the objective ward.
3	Actual conditions and courses of treatment of objective patient are collected from attending doctors and nurses.
4	Each team member confirms the patient's condition and status at bedside and fills out the indication sheet.
5	All the team members discuss future directions and patient issues.
6	Recommendations are provided to the attending doctors and nurses.
7	The indication sheet is copied, the original is placed in the medical record, and the copy is sent to the Medical Professions Division for calculation.

1, and the team members participating in rounds and their professions are shown in Table 1. During rounds, team members shared their opinions on each patient's condition and ventilator use based on the results of their evaluations, and indicated their recommendations on the sheets. The dental professionals provided training or advice about oral health management to the ward nurses if improvements in oral health care were necessary. The status of the rounds is shown in Fig. 2 and procedures in Table 2. The medical engineers provided information on the ventilators being used by patients to the team members. Based on this information, indication sheets are produced in the Department of Dentistry. Rounds were made with the instruction sheets each Friday, and team members indicated their recommendations on the sheets. The evaluation contents of each team member are shown in Table 3.

Table 3 Contents of activities of each team member.

Team member	Contents
Medical doctor	Assessment of general and respiratory condition Discussion of adequacy of ventilator modes Advisability of weaning Recommendations to the ward staff
Certified nurse in intensive care	Confirmation and instruction on postural drainage, rising ability, method of suction, infectious risk, and nursing-care management
Medical engineer	Confirmation of management of ventilators Adjustment of ventilator settings
Dentist	Assessment of oral health status Advisability of dental treatment
Dental hygienist	Instruction on oral health care to the ward staff
Physiotherapist	Assessment of range of motion of the whole body, especially breathing muscles

Table 4 Assessment criteria for oral health

Item	Criteria
Oral condition	Assessment of lips, oral mucosa, and tongue surface Problems at present: dry or cracked lips, blisters or ulceration on oral membrane, and dry or thick white tongue coating No problems: no significant changes in oral condition
Mobile tooth	Assessment of residual teeth Problems at present: mobility is found in one or more teeth No problems: no tooth shows mobility
Tooth brushing	Assessment of oral health care Problems at present: dental plaque, debris, or discharge in an oral cavity No problems: no significant changes in oral health care

In this study, numerical evaluations were performed for the contents of the activities and evaluation items. The evaluation criteria for each item are shown in Table 4.

This study was carried out under the experimental protocols approved in advance by the institutional review board of the School of Dentistry, Showa University (Approval number 2010–22).

Results

A breakdown of departments to which the intervention patients were admitted is shown in Fig. 3. The number

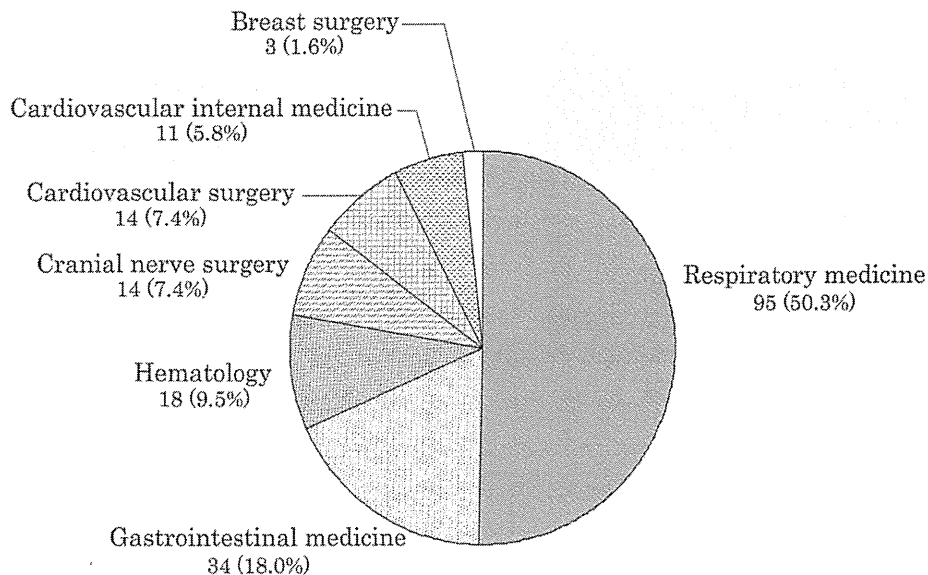


Fig. 3 Department breakdown of intervention requests.

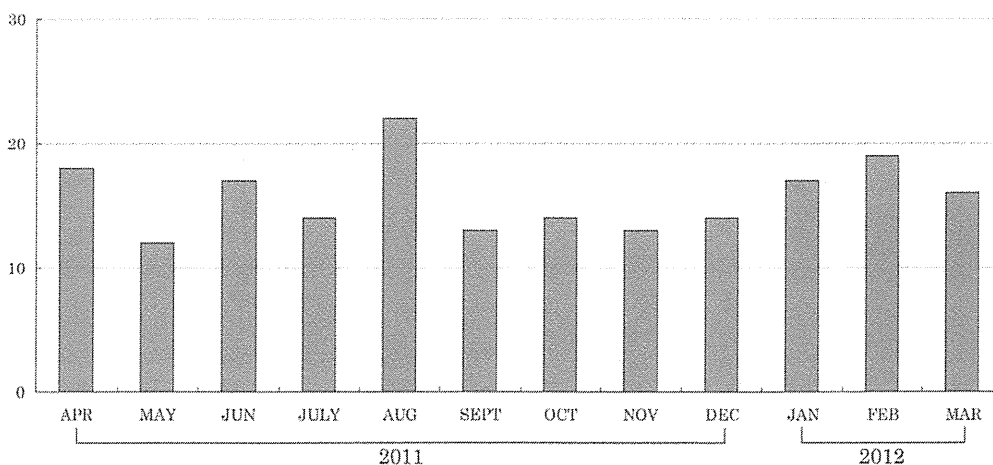


Fig. 4 Monthly number of interventions by RST.

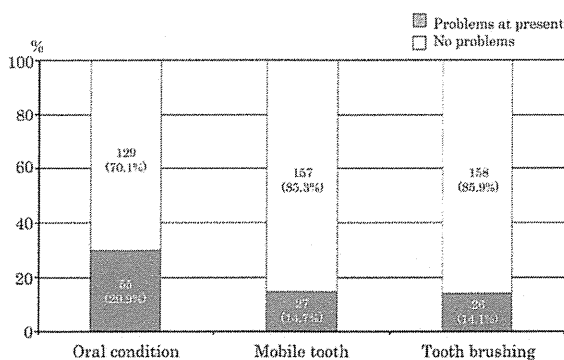


Fig. 5 Rates of oral problems.

of interventions was the highest for respiratory medicine, followed in order by hematology, cranial nerve surgery, cardiovascular surgery, cardiovascular internal medicine, and breast surgery. The number of patients requiring intervention by month is shown in Fig. 4. The number of patients was highest (22 people) in August 2011. Throughout the year, the number of patients per month was 10–20, and only slightly varied among the months.

The rates of patients having problems with “oral condition”, “mobile teeth”, or “tooth brushing”, which were items evaluated by dental professionals, are shown

in Fig. 5. There were problems with "oral condition" in 55 patients (29.9%), "mobile teeth" in 27 (14.7%), and tooth brushing in 26 (14.1%).

Discussion

The use of a ventilator is an important medical treatment to sustain life. However, its long-term use has been suggested to increase the risks of developing respiratory infection and decrease patients' respiratory function.⁵⁻⁷⁾ When the use and management of ventilators are inappropriate, these risks further increase and may cause accidents that can be avoided.⁸⁾ Therefore, at our hospital, an RST was established before the introduction of the remuneration for medical care. The RST evaluated ventilators and associated care methods within the hospital to standardize ventilator-associated care. In particular, management methods of breathing circuits and attachment of intubation tubes were standardized in some wards. Subsequently, to improve the quality of medical care, dental professionals were included in the RST, and they have opportunities to provide information on oral hygiene and to offer suggestions on more pertinent methods of oral hygiene management to the ward staff. In this study, we numerically assessed the contents of RST activities during the year, clarified the status of the activities, and evaluated oral health problems.

In patients who underwent oropharyngeal intubation, physical stimuli occurring due to tube fixation and body movements may injure the lips and oral mucosa. Indeed, ulcer, dryness, and cheilosis angularis have been reported.^{9,10)} A previous study reported oral health problems in 70% of inpatients admitted to acute stage hospitals without full-time dental professionals.²⁾ Oral health care by nurses was performed 3 or 4 times a day in the objective wards of this study. In addition, the dental hygienists regularly provided training to the nurses of some wards, and oral health care methods were standardized as much as possible in these wards. The incidence of these problems in this study may have been reduced by standardized nursing care, such as periodical changes in the location of the tube after

intubation in the ICU and moisture retention when the lips and mouth angles become dry. In oral health care, the prevention of dryness not only in the oral cavity but also around the lips is important. However, dryness and a decrease in secretion can develop as adverse effects of antihypertensive or psychotropic drugs. Therefore, whether dryness is due to the underlying disease/drug administration or oral function problems should be determined as a measure against oral dryness, which is difficult to improve using oral care alone. Therefore, an evaluation of oral dryness may be necessary for oral care.

There are areas requiring improvement in the activities of the RST. The main problem was numerical evaluation of the outcomes of activities. At present, ventilator-associated knowledge and techniques are passed on to the ward staffs through the RST's rounds. However, since rounds are performed only once a week, the ventilator withdrawal status and presence/absence of accidents cannot be clarified by RST activity alone. In addition, since indication sheets presently differ according to the type of ventilator, each time the ventilator type is changed, the ward staff has to become accustomed to a different sheet entry method. Similarly, there are no standard criteria in the hospital for ventilator settings and facemask selection, which are determined at the physician's or another ward staff member's discretion. Although management methods for ventilators and patients have been standardized based on previous activities, the standardization of other aspects has not yet been determined. An increase in the number of rounds or length of time per round would create difficulties due to the work load of each team member. Therefore, it is necessary to re-evaluate the contents of future activities, assess the situation of the RST at the hospital, effectively perform coping mechanisms, and improve the methods for numerical evaluation of outcomes of activities. In addition, it is necessary to examine the effects of the intervention by dental professionals using rate of VAP onset or respiratory infections in the wards.

Conclusion

We established a method for the management of ventilators at Showa University through knowledge transmission from the members of the RST to the staff of the wards. However, some future recommendations were given via indication sheets that varied according to the type of ventilator, and no standardization of facemask choice or ventilator settings was found. Additionally, it is necessary to determine whether the participation of dental professionals improved the awareness of staff nurses or had an effect on oral health care.

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原 著

外来歯科医療費の10年間の推移における都道府県の類型化とその要因

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概要：平成12~22年度の10年間に於いて歯科診療医療費は2兆5千億円から2兆6千億円のほぼ横ばいで推移した。しかしその間の都道府県を単位とした外来歯科医療費をみると変化が一様ではなかった。そこでその増減により増加型、減少型、全国型の3群に類型化することを試みた。年度と外来歯科医療費を用いたSpearmanの順位相関係数を算出して類型化した結果、増加型は7府県、減少型は24道県、全国型は16都県であった。この3類型に関連する要因を明らかにするためにその期間の歯科診療所数、総人口、高齢者人口(65歳以上および75歳以上)、1人当たり県民所得、3歳児1人平均う歯数、歯学部・歯科大学の有無の因子のうちどの因子の関連が強いかを検討した結果、歯科診療所数、総人口および高齢者人口が有意に関連し、そのなかでも65歳以上高齢者人口が最も強く関連していることが示された。わが国における高齢化は全国一様でないことから、今後は各地域に応じた歯科保健医療の体制づくりが求められている。

索引用語：歯科診療医療費、都道府県、高齢者人口

緒 言

国民医療費¹⁾のなかの歯科診療医療費(以下、歯科医療費)は、平成8年度に約2兆5千億円に達してから、平成19年度は2兆5千億円に達しなかったものの平成22年度まで、2兆5千億円から2兆6千億円とほぼ横ばいで推移しておりほとんど変化していない状況である。しかしこの間における歯科医療費の最も構成割合が高い年齢階級をみると、平成12年度は45~64歳であったが、平成20年度以降は65歳以上となっていた¹⁾。このように歯科医療費の総額が変わらないなかで、年齢階級別の歯科医療費の構成割合の変化が認められている。この歯科医療費には入院医療を含んでいるが、平成22年度の医療費の動向調査結果²⁾によると、歯科医療費の入院外医療費が占める割合は98.3%を占めており、さらにこの入院外医療費の96.9%は歯科診療所によるものである。つまり、わが国における歯科医療提供は、歯科診療所において外来を中心として提供されている実態がある。

また、著者らは平成12~20年度における都道府県の住民1人当たり外来歯科医療費の地域差は増大する傾向にあることを示した³⁾。さらにこの住民1人当たり外来歯科医療費は歯科診療所数や歯学部・歯科大学数とは有意な正の相関、小児う蝕有病状況とは負の相関を示すことも明らかにした。つまり、わが国の歯科医療費の総額が変化しない状況でも、都道府県別に分析すれば、諸因子により住民1人当たり外来歯科医療費に格差が生じていた。

さらにわれわれは、過去の分析⁴⁾において歯科医療費総額が変わらないなかでも、都道府県ごとには増減傾向が明らかに存在していることを認めている。

そこで本研究は、平成12~22年度の都道府県別外来歯科医療費の増減を類型化すること、および類型に関連する要因を探ることを目的とした。

資料および方法

1. 資料

1) 歯科医療費

平成12~22年度の各年度における概算医療費データベース⁵⁾から、都道府県別歯科医療費のうち外来歯科医療費のデータを得た。

2) 人口

平成12年度と22年度における人口推計⁶⁾の都道府県

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受付:平成25年7月24日
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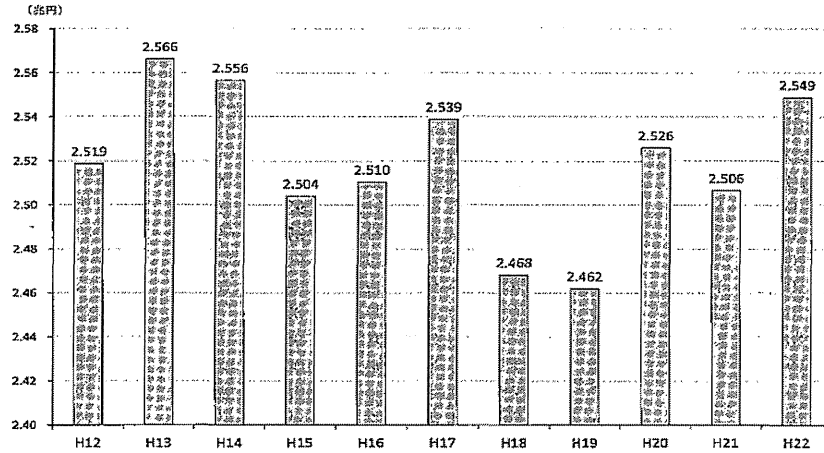


図1 外来歯科医療費総額の推移 (平成12~22年度)

別データを用いた。また高齢者人口として65歳以上人口と75歳以上人口を用いた。

3) 歯科診療所数

医療施設静態・動態調査⁷⁾より平成12年度と22年度の都道府県別歯科診療所数のデータを使用した。

4) 3歳児1人平均う歯数

厚生労働省母子保健課から日本歯科医師会に提供された平成12年度と22年度の都道府県別3歳児1人平均う歯数を使用した。

5) その他

内閣府の県民経済計算⁸⁾から平成12年度と22年度の都道府県の1人当たり県民所得のデータを得た。

2. 分析および統計手法

1) 都道府県別外来歯科医療費割合

都道府県別外来歯科医療費について、平成12年度を100とし、22年度までの各年度の割合(%)を算出した。

2) 類型化

各都道府県の外来歯科医療費の10年間の増減について、増加型、減少型、全国型の3つに類型化した。類型化に際し、まずわが国全体の外来歯科医療費について、年度と外来歯科医療費のSpearman順位相関(-0.264)を算出し、有意な相関関係にないことを確認した(p=0.433)。次に各都道府県について外来歯科医療費と年度との相関を検討し、有意(p<0.05)な正の相関であれば増加型、有意な負の相関であれば減少型、有意な相関がなければ全国型とした。

3) 統計分析

3類型に関連する要因を検討するため、歯学部・歯科

大学の有無については χ^2 検定を行った。また、平成12年度を100としたときの22年度の歯科診療所数、総人口、高齢者人口(65歳以上および75歳以上)、1人当たり県民所得および3歳児1人平均う歯数の割合を使用し、一元配置の分散分析を行った。

データ処理には、Microsoft Excel 2010 (Microsoft Corporation, USA) を、統計分析にはSPSS 20.0 for Windows (IBM Japan, 東京) を使用した。

結 果

1. 都道府県別外来歯科医療費の類型化

図1にわが国の外来歯科医療費総額の10年間の推移を示した。減少傾向はみられるが年度と外来歯科医療費の間には有意な相関関係はみられなかった(順位相関係数:-0.264, p=0.433)。

表1には、平成12年度を100とした場合の各年度における各都道府県外来歯科医療費割合を、さらに表2にはその割合と年度の相関係数(Spearmanの順位相関)、有意確率、増加型、全国型、減少型の3群に分類した結果および歯学部・歯科大学の有無を示した。増加型は7府県、減少型は24道県、全国型は16都県であった。

2. 都道府県別外来歯科医療費の類型化に影響する因子

外来歯科医療費の推移の3群と歯学部・歯科大学の有無の分布には有意な関連はみられなかった(p=0.453, χ^2 検定, 表2)。

表3には、平成12年度を100としたときの22年度の歯科診療所数、総人口、高齢者人口(65歳以上および75

表1 平成12年度を100としたときの各都道府県の各年度における外来歯科医療費の割合(%)

	H12	H13	H14	H15	H16	H17	H18	H19	H20	H21	H22
全国	100.0	101.9	101.5	99.4	99.7	100.8	98.0	97.7	100.3	99.5	101.2
北海道	100.0	101.5	100.2	95.9	94.7	94.7	91.3	90.4	91.7	89.7	90.5
青森県	100.0	102.7	101.3	98.0	96.3	96.9	93.9	90.8	92.1	89.9	89.8
岩手県	100.0	101.4	100.2	97.1	96.8	96.6	94.8	93.3	95.8	94.2	93.3
宮城県	100.0	103.0	101.2	98.4	98.9	99.8	97.6	97.7	99.9	99.4	97.9
秋田県	100.0	101.0	99.2	95.4	95.1	94.4	93.3	90.8	91.5	90.0	89.2
山形県	100.0	102.2	101.9	100.1	99.8	99.9	97.3	96.4	100.7	99.5	100.0
福島県	100.0	102.9	101.5	98.9	98.3	99.4	96.9	96.0	98.1	95.9	94.0
茨城県	100.0	101.3	100.0	99.4	99.9	100.3	99.4	100.2	102.5	101.7	101.7
栃木県	100.0	101.6	101.0	100.1	99.6	100.9	97.8	98.1	100.5	100.2	100.0
群馬県	100.0	101.7	100.8	99.6	99.5	101.1	98.5	99.1	102.8	102.9	104.2
埼玉県	100.0	103.4	103.4	103.1	104.3	106.2	104.2	105.3	108.9	109.2	111.9
千葉県	100.0	103.2	103.7	103.2	104.4	106.0	102.9	103.4	106.1	106.1	108.3
東京都	100.0	102.6	102.6	101.5	101.7	102.6	98.7	98.3	100.9	100.8	102.4
神奈川県	100.0	102.7	102.3	100.7	101.2	102.5	98.7	98.1	99.6	99.2	100.7
新潟県	100.0	101.0	99.9	97.6	95.4	96.9	94.2	93.1	95.8	93.8	94.7
富山県	100.0	101.2	99.4	94.2	93.0	93.1	89.8	87.3	89.9	89.5	90.7
石川県	100.0	100.9	99.3	95.8	95.0	95.0	93.2	92.9	94.7	92.2	92.9
福井県	100.0	101.8	101.7	98.3	96.5	97.1	95.1	94.4	97.6	96.3	97.3
山梨県	100.0	100.7	99.9	97.5	97.3	98.5	95.2	94.1	98.0	96.0	96.6
長野県	100.0	100.9	101.1	98.7	98.6	99.1	96.1	95.2	99.3	97.4	98.3
岐阜県	100.0	101.0	102.1	100.8	102.1	103.3	100.5	100.8	104.9	102.9	106.0
静岡県	100.0	102.0	101.8	99.5	99.8	101.1	95.4	93.0	94.4	92.5	94.2
愛知県	100.0	101.2	100.6	99.0	99.7	101.0	99.5	100.1	105.1	105.1	108.2
三重県	100.0	101.0	100.9	99.6	99.9	100.6	97.7	96.7	99.2	98.1	99.6
滋賀県	100.0	101.1	100.0	99.3	99.3	100.0	97.9	97.9	100.5	101.2	103.5
京都府	100.0	102.2	102.1	101.4	103.0	104.3	102.2	102.4	104.8	104.4	106.7
大阪府	100.0	102.3	103.0	101.3	102.5	104.4	102.8	103.6	106.1	105.4	108.6
兵庫県	100.0	101.9	101.9	100.8	102.2	103.7	101.3	102.0	104.5	103.6	105.7
奈良県	100.0	102.4	101.3	100.2	100.9	101.0	98.7	100.0	102.8	101.8	103.3
和歌山県	100.0	101.5	100.3	97.3	96.5	96.2	93.1	92.7	93.7	91.6	93.0
鳥取県	100.0	102.0	102.7	99.7	98.5	98.8	97.6	95.2	96.8	95.2	95.3
島根県	100.0	100.0	98.1	94.0	92.8	93.7	91.6	90.5	93.1	91.6	92.7
岡山県	100.0	101.5	101.6	99.1	100.1	101.9	101.0	101.4	105.1	104.8	106.3
広島県	100.0	101.7	101.8	98.9	99.5	101.8	99.9	99.4	102.0	100.7	103.0
山口県	100.0	100.4	100.5	96.8	95.9	97.9	95.1	93.5	96.6	95.0	97.3
徳島県	100.0	99.7	98.8	95.6	94.9	96.4	95.7	95.3	97.8	97.4	98.4
香川県	100.0	101.6	99.8	96.9	97.3	99.4	98.5	97.7	100.2	99.6	102.2
愛媛県	100.0	100.4	101.1	99.0	98.9	100.7	98.2	97.1	98.6	96.1	97.2
高知県	100.0	100.4	99.2	95.3	93.2	94.3	91.3	90.2	91.5	89.3	91.2
福岡県	100.0	101.6	100.6	96.5	96.9	98.5	95.1	95.0	97.0	96.2	98.3
佐賀県	100.0	101.1	101.5	97.9	99.3	100.3	97.3	96.0	98.1	97.0	98.2
長崎県	100.0	100.4	99.2	96.0	92.6	88.9	83.1	83.1	85.3	83.8	84.7
熊本県	100.0	100.0	99.1	95.2	94.3	95.4	92.3	91.7	93.9	93.0	94.1
大分県	100.0	101.3	101.2	97.4	99.0	101.3	97.6	97.4	100.2	100.1	100.8
宮崎県	100.0	101.3	101.0	96.8	97.2	98.6	96.6	95.5	97.3	98.1	100.4
鹿児島県	100.0	101.4	97.9	93.8	93.6	95.0	91.6	90.8	91.8	90.9	93.6
沖縄県	100.0	100.1	100.1	98.0	99.2	99.7	93.4	92.1	94.5	94.7	98.5

表2 平成12～22年度の各都道府県における外来歯科医療費と年度との順位相関係数と有意確率, 有意確率による類型化, および歯学部・歯科大学の有無

	年度との順位相関係数	有意確率	類型	歯学部・歯科大学の有無
全国	-0.264	0.433		
埼玉県	0.927	0.000	増加型	有
京都府	0.882	0.000	増加型	—
大阪府	0.882	0.000	増加型	有
兵庫県	0.773	0.005	増加型	—
千葉県	0.764	0.006	増加型	有
岡山県	0.682	0.021	増加型	有
岐阜県	0.645	0.032	増加型	有
茨城県	0.555	0.077	全国型	—
愛知県	0.536	0.089	全国型	有
群馬県	0.373	0.259	全国型	—
奈良県	0.336	0.312	全国型	—
広島県	0.291	0.385	全国型	有
滋賀県	0.245	0.467	全国型	—
香川県	0.100	0.770	全国型	—
大分県	-0.091	0.790	全国型	—
東京都	-0.255	0.450	全国型	有
徳島県	-0.327	0.326	全国型	有
宮崎県	-0.327	0.326	全国型	—
栃木県	-0.336	0.312	全国型	—
山形県	-0.418	0.201	全国型	—
神奈川県	-0.545	0.083	全国型	有
福岡県	-0.573	0.066	全国型	有
宮城県	-0.582	0.060	全国型	有
佐賀県	-0.636	0.035	減少型	—
山口県	-0.645	0.032	減少型	—
福井県	-0.655	0.029	減少型	—
長野県	-0.682	0.021	減少型	有
沖縄県	-0.691	0.019	減少型	—
三重県	-0.727	0.011	減少型	—
山梨県	-0.736	0.010	減少型	—
鹿児島県	-0.773	0.005	減少型	有
愛媛県	-0.791	0.004	減少型	—
熊本県	-0.800	0.003	減少型	—
島根県	-0.809	0.003	減少型	—
新潟県	-0.827	0.002	減少型	有
富山県	-0.845	0.001	減少型	—
静岡県	-0.845	0.001	減少型	—
長崎県	-0.845	0.001	減少型	有
北海道	-0.900	0.000	減少型	有
和歌山県	-0.909	0.000	減少型	—
鳥取県	-0.909	0.000	減少型	—
福島県	-0.918	0.000	減少型	有
石川県	-0.918	0.000	減少型	—
高知県	-0.918	0.000	減少型	—
岩手県	-0.927	0.000	減少型	有
青森県	-0.955	0.000	減少型	—
秋田県	-0.982	0.000	減少型	—

表3 平成12年度を100としたときの22年度における歯科診療所数、総人口、高齢者人口(65歳以上)、高齢者人口(75歳以上)、1人当たり県民所得および3歳児1人平均う歯数の割合(%)

	歯科診療所数	総人口	高齢者人口 (65歳以上)	高齢者人口 (75歳以上)	県民所得	3歳児1人 平均う歯数
北海道	103.8	96.9	135.5	161.7	87.5	62.7
青森県	101.8	93.0	133.0	161.6	98.6	64.0
岩手県	109.3	93.9	126.4	154.8	85.0	60.0
宮城県	107.7	99.3	129.3	162.8	89.6	56.7
秋田県	98.5	91.3	125.9	154.4	97.5	56.2
山形県	104.8	94.0	120.2	148.4	85.3	56.5
福島県	107.9	95.4	123.3	151.9	90.7	67.3
茨城県	108.1	99.5	135.6	152.4	88.6	54.9
栃木県	107.9	100.2	128.2	152.4	90.3	63.4
群馬県	111.7	99.2	129.6	150.0	85.7	51.2
埼玉県	118.6	103.7	159.1	176.3	92.6	71.0
千葉県	112.7	104.9	152.2	175.1	94.4	53.7
東京都	106.4	109.1	128.1	163.7	84.3	55.7
神奈川県	113.5	106.6	146.6	180.0	91.7	59.5
新潟県	105.3	95.9	123.7	146.3	89.8	50.2
富山県	105.1	97.5	126.3	145.1	83.9	51.8
石川県	110.1	99.1	127.6	147.9	86.6	55.0
福井県	103.7	97.2	123.4	148.6	90.4	61.2
山梨県	102.4	97.2	126.6	143.6	86.1	66.4
長野県	104.5	97.2	123.7	143.9	86.4	61.6
岐阜県	105.7	98.7	132.5	156.1	85.6	47.0
静岡県	106.5	100.0	134.9	158.6	86.6	55.6
愛知県	108.1	105.2	139.8	167.1	87.0	47.1
三重県	105.0	99.9	128.6	155.9	93.4	74.7
滋賀県	111.7	105.1	128.2	157.8	88.0	52.0
京都府	105.8	99.7	133.7	149.7	95.5	54.8
大阪府	109.1	100.7	149.7	170.6	90.0	58.6
兵庫県	108.0	100.7	136.3	160.5	86.1	55.1
奈良県	108.5	97.1	143.8	158.2	85.3	58.2
和歌山県	97.0	93.6	129.5	144.3	94.4	59.9
鳥取県	98.5	96.1	119.5	143.3	84.8	54.7
島根県	98.3	94.1	117.0	140.0	86.1	61.0
岡山県	105.2	99.7	124.8	148.0	93.5	57.5
広島県	109.3	99.4	129.8	147.0	85.8	56.4
山口県	101.5	95.0	125.4	143.5	94.8	70.3
徳島県	107.8	95.3	123.0	149.4	92.1	50.4
香川県	111.6	97.4	123.8	145.7	91.8	63.5
愛媛県	106.9	95.9	124.6	145.3	89.0	66.7
高知県	104.0	93.9	122.6	141.9	84.2	56.8
福岡県	108.0	101.1	128.4	152.6	95.7	50.9
佐賀県	112.2	96.9	120.5	146.2	88.1	56.7
長崎県	101.5	94.1	125.2	147.8	92.5	54.4
熊本県	109.8	97.7	120.4	147.1	89.9	64.1
大分県	103.8	98.0	122.3	149.1	81.7	69.8
宮崎県	106.9	97.0	124.4	155.4	89.7	62.6
鹿児島県	106.1	95.5	117.4	143.5	93.0	54.3
沖縄県	105.0	105.7	124.4	155.1	97.3	58.9

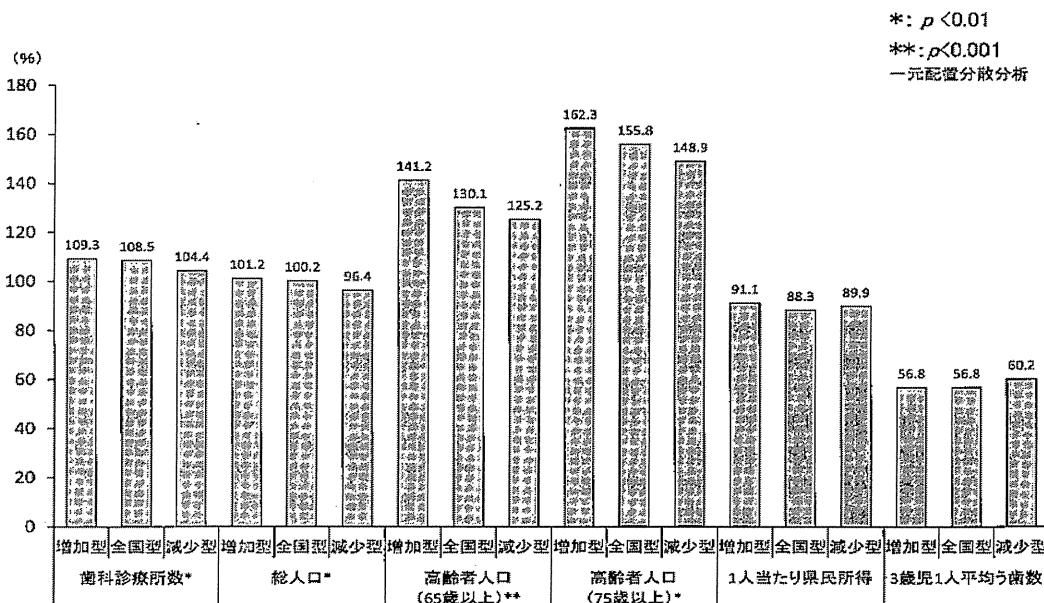


図2 外来歯科医療費類型別にみた各因子割合 (平成12年度を100とした場合の平成22年度の割合)

歳以上)、1人当たり県民所得、3歳児1人平均う歯数の割合を示した。10年間に於いて4県で歯科診療所数が減少していた。人口はほとんどの都道府県で減少するなか、11都県では増加していた。高齢者人口はすべての都道府県で増加していた。また、1人当たり県民所得および3歳児1人平均う歯数はすべての都道府県で減少していた。

都道府県歯科医療費増減を3群(増加型、全国型、減少型)に分類した場合の歯科診療所数、総人口、高齢者人口(65歳以上および75歳以上)、1人当たり県民所得および3歳児1人平均う歯数の10年間の変化割合についてそれぞれの平均値を求め、3群間の変化割合平均値について一元配置分散分析を用いて比較を行った(図2)。その結果、歯科診療所数、総人口、高齢者人口(65歳以上および75歳以上)において3群間に有意差がみられ、そのなかでも特に65歳以上の高齢者人口の有意差が最も著明(p<0.001)であった。

考 察

わが国における歯科医療費は平成8年以降、2兆5千億円から2兆6千億円でほぼ横ばいに推移してきた。しかしながら都道府県別にみると、増加や減少する都道府県があり、一様でないことを著者らは示してきた⁴⁾。この報告で使用した平成17年データでは、歯科医療費の

増減に関連する要因は人口や歯科診療所数のみであった。またその他の報告でも、歯科医療費の都道府県における差について、歯科医療機関数との関連⁹⁾や歯科大学の有無との関連¹⁰⁾などが報告されている。しかし、本研究において、平成22年度までの外来歯科医療費の増減を3群に分けてみた場合に、65歳以上の高齢者人口の増加割合が最も強く関連することが明らかとなっており、これまでの報告とは若干異なった傾向を示したことは非常に興味深い。特に75歳以上高齢者人口割合よりも65歳以上人口割合の関連がより強いことにより、65~74歳での歯科医療のニーズが高いことが予測される。つまり、いわゆる団塊世代(昭和22~24年生まれ)を中心とした人々が徐々に65歳以上に移行していくなかで、歯を多く有する状況で65歳を迎えた人々は歯科医療のニーズが高いのではないかと考察できる。

国民医療費における歯科医療費¹⁾の年齢階級別の構成割合は、平成12年度では45~64歳の年齢階級が37%で最も多かった。しかし平成22年度では65歳以上の年齢階級が最も多く34.4%を占めている。この逆転現象は平成20年度よりみられており、14歳までの歯科医療費割合はほぼ変化がみられないが、15~64歳までの年齢層においてその構成割合は減少する傾向がみられている一方で、65歳以上の年齢階級の歯科医療費の構成割合は徐々に増加している。