学 位 研 究 紹 介

日本における地域在住90歳高齢者の口腔衛生と栄養摂取に関する横断研究
Oral Health and Nutrition among 90-Year-Old Japanese People

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【Introduction】

Good oral health is essential in eating, speaking, socializing, and protecting our body from external pathogens[1]. Older adults' decline in oral health conditions can affect eating, resulting in altered nutritional intake[2] and inferior quality of life[3]. This study aimed to examine the association between three elements of oral health (dentition, mastication, and salivation) and nutritional intake in 90-year-old Japanese adults.

【Materials and Methods】

In 2018, we asked 90-year-old adults who were participants of the Niigata Cohort Study to come to the survey sites at community halls. Eighty-eight participants (41 men and 47 women) participated in the survey. We used questionnaires to gather data on demographic information, nutritional intake, and higher-level functional capacity. Nutritional intake was assessed using the Brief-Type Self-Administered Diet History Questionnaire (BDHQ)[4]. Higher-level functional capacity was measured using the Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG-IC)[5]. Oral examinations, masticatory performance tests, saliva tests, blood tests, and body measurements were conducted.

BDHQ is a food frequency questionnaire developed to examine dietary intake estimates for 58 food and beverage items in the previous month[6,7]. Based on a review of nutrients important for older adults[8] and nutrients thought to be connected to oral health[9], the nutrients chosen for the data analysis were determined.

The TMIG-IC is a 13-item questionnaire with three domains: social role, intellectual activity, and instrumental activity of daily life. The TMIG-IC score indicates dependency, cognitive function, and social health in addition to physical function[4].

The oral health assessment consisted of a dental examination, a masticatory performance test, and a stimulated salivary flow (SSF) test. Univariate and multivariate linear regression analyses were conducted. Detailed information on the methods has been described in our previously published article[10].

【Results】

After adjustment for sex, education, higher-level functional capacity (TMIG-IC), and undernutrition tendency (BMI ≤20 kg/m^2), as shown in Table1, multivariable linear regression analyses found a positive association between masticatory performance and vitamin A intake. Participants with a masticatory performance of <173 mg/dL consumed less folic acid, iron, and vitamin A than those with a masticatory performance of ≥173 mg/dL. SSF was positively associated with the consumption of vitamin A, B2, n-6 fatty acids, and γ-tocopherol, but adversely associated with the consumption of carbohydrates. The higher consumption of folic acid, beta-carotene, and vitamin C was associated with an increasing number of remaining teeth.

【Discussion】

We focused on 90-year-old participants, for whom there are few studies on dietary consumption and oral health. Additionally, we employed validated techniques to objectively quantify masticatory performance and used clinical measures for all oral health indices. Finally, we included the less-studied component of oral health, such as salivary flow rate. The cross-sectional design, limited sample size, incomplete dimensions of

oral health, and the omission of the interaction among the three oral health parameters are the limitations of the present study.

【Conclusion】

The intake of various micronutrients, including vitamin A, beta-carotene, and folic acids, was lower in Japanese people who were older because of worse masticatory ability, reduced SSF, and fewer teeth. In older adults with impaired mastication, dry mouth, and significant tooth loss, oral health professionals should pay close attention to their nutritional intake.

【References】

1）Ogawa H, McKenna G, Kettratad-Pruksapong M. Prevention of Oral Functional Decline. *International Dental Journal* 2022; **72**（4, Supplement）: S21-S6.

2）Tada A, Miura H. Systematic review of the association of mastication with food and nutrient intake in the independent elderly. *Arch Gerontol Geriatr* 2014; **59**（3）: 497–505.

3）Petersen PE, Yamamoto T. Improving the oral health of older people: the approach of the WHO Global Oral Health Programme. *Community Dentistry and Oral Epidemiology* 2005; **33**（2）: 81-92.

4）Sasaki S. Development and evaluation of dietary assessment methods using biomarkers and diet history questionnaires for individuals. *Research for evaluation methods of nutrition and dietary lifestyle programs held on Healthy Japan 21 Summary report* 2004: 10-44.

5）Koyano W, Shibata H, Nakazato K, Haga H, Suyama Y. Measurement of competence: reliability and validity of the TMIG Index of Competence. *Arch Gerontol Geriatr* 1991; **13**(2): 103–16.

6）Kobayashi S, Murakami K, Sasaki S, et al. Comparison of relative validity of food group intakes estimated by comprehensive and brief-type self-administered diet history questionnaires against 16 d dietary records in Japanese adults. *Public Health Nutr* 2011; **14**（7）: 1200-11.

7）Kobayashi S, Honda S, Murakami K, et al. Both comprehensive and brief self-administered diet history questionnaires satisfactorily rank nutrient intakes in Japanese adults. *J Epidemiol* 2012; **22**（2）: 151-9.

8）Bernstein M. Nutritional needs of the older adult. *Phys Med Rehabil Clin N Am* 2017; **28**(4): 747–66.

9）Henshaw MM, Calabrese JM. Oral health and nutrition in the elderly. *Nutr Clin Care* 2001; **4**（1）: 34–42.

10）Karawekpanyawong R, Nohno K, Kubota Y, Ogawa H. Oral Health and Nutritional Intake in Community-Dwelling 90-Year-Old Japanese People: A Cross-Sectional Study. *Gerodontology* 2022.

Table 1. Summary of the main findings

Variable / Nutrient*	MP (mg/dL)	Presence of lower MP (<173mg/dL)	SSF (ml/3 min)	Hyposalivation	Number of teeth (teeth)
Vitamin A	+	++	++		
Folic acid		++			+
Iron		+			
Carbohydrate			-		
γ-tocopherol			+		
Vitamin B_2			+		
N-6 fatty acids			+		
β-carotene					++
Vitamin C					+

MP: masticatory performance; SSF: stimulated salivary flow rate
Hyposalivation: SSF ≤ 0.7mL/min
**List of nutrients with p < 0.05 (two-sided) and q (minimal false discovery rate) < 0.05*
++: Positive association with a large effect size (the absolute value of unstandardized correlation coefficient (B) more than 10 as relatively compared within the study); +: Positive association; -: Negative association