Ten-year tertile shift of middle-aged males by number of present teeth and sound teeth

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Abstract : The purpose of this study was to ascertain the change in the ranking of participants by present teeth (PT) and sound teeth (ST) by cohort analysis. Dental examinations on 89 males, aged 40 to 49, were conducted by two calibrated dentists in 1992 and 2002. The data were serialized in descending order by the total number of PT and ST in the baseline data and were then divided into tertiles. Using the data from ten years later, the same subjects were again divided into tertiles. Some of them moved up or down while some remained in the same tertile during the ten-year observation period. Of the 30 participants in the top tertile at baseline, 23 (23/30, 76.7%) remained there during the ten-year period. Of the 30 participants in the middle tertile at baseline, 20 (20/30, 66.7%) remained. Of the 29 participants in the bottom tertile at baseline, 22 (22/29, 75.9%) remained. Participants who had a given cumulative relative frequency of PT at baseline tended to remain in the same tertile ten years later. Numbers of PT and ST is related to future numbers of PT and ST.

Key words : Percentile, Present teeth, Sound teeth, Adults

Introduction

Percentile curves of numbers of present teeth (PT) were developed by Osada et al.[1)] in 1990. Percentile curves are useful indicators because they allow individual clients and patients to visibly recognize and understand their own oral health status compared to that of the general population. Osada[2)] also introduced smoothed percentile curves for PT in 1999. They estimated percentile curves and values on the basis of the distribution of numbers of missing teeth in 5,036 subjects aged 40-79. Primary data on subjects' missing teeth was obtained from the National Report on the Survey of Dental Disease in 1987[3)] .

Yoshino et al.[4)] introduced percentile curves of present and sound teeth (ST) for use in providing oral health instruction to office workers. Yoshino et al.[5)] also proposed percentile curves of PT in smokers and non-smokers. The percentile curves for PT are not only useful indicators in assessing

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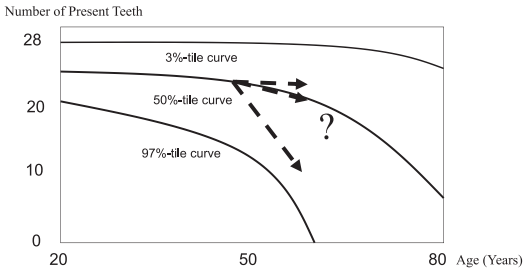

Figure 1　Model of shift of ranking during 10-year observation period
The curves are based on cross-sectional data.

the population, but have also been used in oral health instruction for office workers.

Using percentile curves, patients can clearly see how their own oral status compares with that of their age group in the general population. However, when percentile curves are calculated by sectional data, it is difficult to precisely predict the future PT of a given age group (Fig. 1). The purpose of this study was to ascertain the shift in the ranking of PT and ST by cohort analysis.

Methods

The health insurance union of a bank in Kanagawa has conducted an annual dental examination for insured persons since 1961. The data analyzed in this study is from dental examinations conducted by two calibrated dentists in 1992 and 2002. The two dentists were calibrated before the examinations in order to standardize their diagnostic criteria. The diagnostic criteria of this study were set in accordance with the National Report on the Survey of Dental Disease of 1987[3]. There were 5,113 (participation rate: 5,113/6,292=81.3%) participants in 1992 and 3,277 (participation rate: 3,277/4,007=81.8%) in 2002. The reduced population size can mostly be attributed widespread restructuring at the bank due to worsening economic conditions during the 10-year observation period. The dentists recorded the number of PT, ST, decayed, and filled teeth. The data analyzed in this study was from 89 males aged 40 to 49 who participated in both dental examinations. This age group was selected because tooth loss increases after the age of 40[3]. There were also females who underwent the regular dental examinations, but there were few who underwent both dental examinations in this study. For these reasons, females and subjects 50 years old and over were excluded in this study.

In this study, completely and partially erupted permanent teeth and fused teeth were counted as one tooth. In addition, supernumerary teeth, pontics of bridge prostheses, and implant-supported superstructures were excluded from the number of PT. Third molars were also excluded.

The data were serialized in descending order by the number of PT and, when the number of PT was the same, by the number of ST. Both the baseline data and the data from ten years later were then classified into tertiles. Some of the participants moved up or down while some stayed in the same tertile during the ten-year observation period (Fig. 2).

Statistical Analysis

The comparison of PT and ST among tertile groups was conducted with Tukey and Games-Howell. The level of significance was set at 0.05.

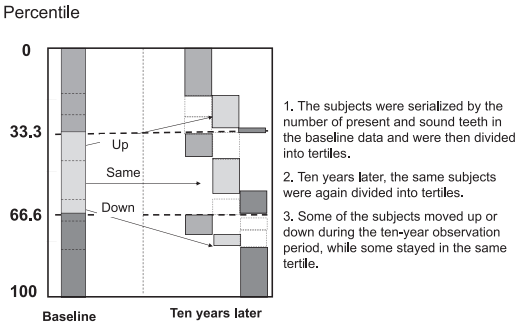

Figure 2　How to read Figure 3

The data was analyzed using the computerized statistical package SPSS, version 15.0 (SPSS Japan, Inc., Tokyo, Japan).

Results

Figure 3 shows the ten-year shift of adult dentition by tertile. Of the 30 participants ranked in the top third at baseline, 23 (23/30, 76.7%) remained in the same tertile, 3 (3/30, 10.0%) moved down to the middle tertile, and 4 (4/30, 13.3%) moved down to the bottom tertile during the ten-year period. Of the 30 participants ranked in the middle third at baseline, 20 (20/30, 66.7%) stayed there while 6 (6/30, 20.0%) moved up to the top tertile and 4 (4/30, 13.3%) moved down to the bottom tertile. Of the 29 participants ranked in the bottom third at baseline, 22 (22/29, 75.9%) remained there while 7 (7/29, 24.1%) moved up to the middle tertile. Participants who were at a given baseline cumulative relative frequency of PT tended to remain in the same tertile ten years later.

Table 1 shows the mean number of PT and ST for each tertile. At baseline, the mean number of PT for each group was 28.0, 27.4, and 24.3, respectively. Ten years later, the mean number of PT for each group was 27.3, 26.4, and 23.1. The mean decrease in PT for each group was 0.7, 1.0, and 1.2, but the differences among the groups were not significant.

At baseline, the mean number of ST for each

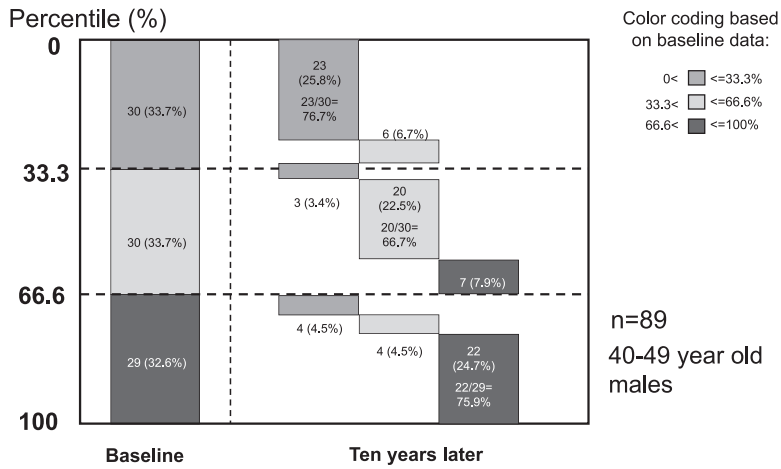

Figure 3 Ten-year shift of the subjects by tertile

Table 1 Mean number of PT and ST by tertile (n=89)

Group		Baseline		Ten years later		Mean decrease of PT and ST during the ten-year period			
	n	PT	ST	PT	ST	PT	Test	ST	Test
Top third	30	28.0(±0)	19.3(±3.7)	27.3(±1.4)	16.2(±5.5)	0.7		3.1	
Middle third	30	27.4(±0.5)	13.8(±4.3)	26.4(±2.3)	11.9(±4.5)	1.0	n.s.	1.9	n.s.
Bottom third	29	24.3(±2.3)	11.6(±4.8)	23.1(±3.6)	9.5(±4.8)	1.2		2.1	

Differences among groups were tested with Tukey and Games-Howell.

group was 19.3, 13.8, and 11.6, respectively. Ten years later, the mean number of ST for each group was 16.2, 11.9, and 9.5. The mean decrease in ST for each group was 3.1, 1.9, and 2.1, but the differences among the groups were not significant.

Discussion

In this study, percentage of participants who were changed among teritle groups was small relatively. These results show that the ranking of PT and ST did not change much during the ten-year period. Because loss of PT is caused by irreversible disease, as the number of PT decreases, the likelihood of losing more teeth increases. Yoshino et al.[6] performed a six-year generational cohort analysis in which they estimated future tooth loss based on the number of PT. They found that the rate of tooth loss increased as the number of PT decreased. Eklund et al.[7] reported that among baseline oral conditions related to total tooth loss, the most convincing association came with the number of remaining teeth. Those with 1-7 teeth at baseline were nearly 20 times more likely to become totally edentulous than those with 24 or more teeth, and this relative risk was unaffected by age. This means that younger people with few teeth were just as likely to become edentulous as older people with few teeth. In the multivariate analyses, the number of remaining teeth at baseline stood out as a remarkably stable predictor of edentulism, even when many other variables were assessed simultaneously. Yamamoto et al.[8] reported retrospectively on tooth loss during maintenance at a university hospital. Patients who lost teeth were older, showed a higher prevalence of severe periodontal disease and hypertension, and had a lower number of PT at the start of the maintenance. Our results support the conclusions of these reports, namely that number of PT is a reliable predictor of individual future tooth loss risk.

In this study, there were no significant differences in the mean number of teeth lost during the ten-year period among the tertile groups. However, this means that participants can not easily change among tertile groups. Participants who were at a given baseline cumulative relative frequency of PT tended to remain in the same tertile ten years later. Numbers of PT and ST is related to future numbers of PT and ST.

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