Patterns of Tooth Loss in Young Adult Hong Kong Chinese Patients in 1983 and 1998

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Abstract

Objective: *To describe and compare patterns of tooth loss in 2 groups of 21- to 25-year-old Hong Kong Chinese patients examined 15 years apart.*

Materials and Methods: *The panoramic radiographs of consecutive young adult patients who attended the primary care department of the Dental School of the University of Hong Kong in 1983 and 1998 were reviewed.*

Results: *The proportions of patients with full dentition were 36.0% in 1983 and 45.1% in 1998. However, when third molars were excluded, the proportions were 44.3% and 62.3%, respectively. The prevalence of missing first molars was 10.5% and 3.2% for the 1983 and 1998 groups, respectively, whereas that for missing third molars was 13.5% and 17.9% and that for missing premolars was 1.9% and 2.4%, respectively; all of the differences were statistically significant (*$p < 0.01$*). Although the first molars, especially the lower first molars, were at greatest risk of being lost in both groups, the prevalence of missing first molars fell substantially (10.5% in 1983, 3.2% in 1998); in contrast, the prevalence of missing premolars and third molars increased.*

Conclusions: *The decline in the prevalence of missing first molars may in part reflect the efficacy of toothbrushing, whereas the increase in missing premolars and third molars reflects increases in orthodontic and oral surgical activity in the intervening period.*

MeSH Key Words: *adult; Hong Kong; tooth loss/epidemiology*

© J Can Dent Assoc 2005; 71(7):473
This article has been peer reviewed.

People of Chinese ethnicity constitute nearly a quarter of the global population. In Canada they are already "the largest visible minority, surpassing one million for the first time" in the 2001 Canadian census,[1] and Chinese people represent the largest visible minority in British Columbia, Alberta and Saskatchewan.[1] Nonetheless, they are underrepresented in the dental literature. The Chinese are not merely a linguistic or cultural group; rather, they constitute a generally well-defined ethnic group. In particular, 93% of Chinese citizens are Han (ethnic Chinese),[2] who differ markedly in terms of mitochondrial DNA polymorphisms from the non-Han Chinese and populations from neighbouring nations.[3] The oral health survey conducted over the past 2 decades in Hong Kong included children and mature adults, but not young adults. To quantify the undoubtedly significant developments in dental care, panoramic radiographs of young adults obtained 15 years apart were reviewed.

Although the culture of Hong Kong is based on traditional Chinese values, which emphasize the importance of the extended family and the community, as well as extensive and increasing application of traditional Chinese medicine, this special administrative region of China is also a vibrant, forward-looking, westernized community that supports wide availability and accessibility of modern health services and accords them high status. Much of the Chinese diaspora to the West emanates from southern China, and the Hong Kong community, which is 95% Han

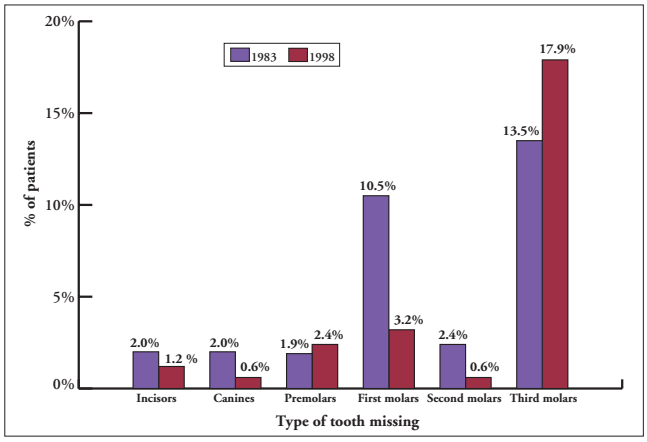

Figure 1: *Proportion of patients with one or more missing teeth of each tooth type for 1983 and 1998.*

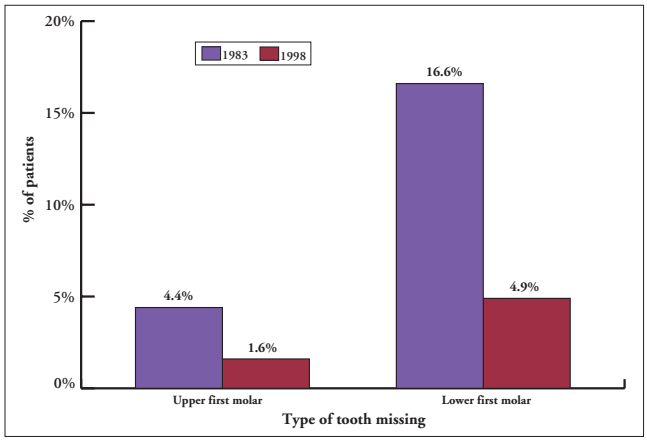

Figure 2: *Proportion of patients with one or more missing upper or lower first molars for 1983 and 1998.*

(predominately Southern Han), is a good model for this diaspora. This model could help Western dental practitioners to serve this population. The aim of this study was to assess the prevalence and type of missing teeth among Southern Han patients 21 to 25 years old at 2 time points over the past 20 years.

Materials and Methods

This study was based on a review of the panoramic radiographs of 2 separate series of consecutive patients presenting to the primary care department of the Dental School of the University of Hong Kong. The first series, obtained in 1983, consisted of 620 patients, and the second series, obtained in 1998 (the year after unification of Hong Kong with the Peoples' Republic of China) consisted of 612 patients. In both series, the subjects were ethnic Chinese (Southern Han). The dental panoramic radiographs had been obtained at the time of each patient's first visit. In each year, the panoramic radiographs were obtained with identical panoramic radiographic units: 2 Panelipse units (GE, Milwaukee, Wisc.) functioning in 1983 and 2 Orthoralix units (Dentsply Gendex, Health Care Dental Ltd, Hong Kong) functioning in 1998. Each radiograph was viewed on a standard light box under normal room lighting. The teeth were charted. A tooth was counted as present if its roots were retained. The teeth were classified as incisors, canines, premolars, first molars, second molars and third molars. After preliminary analysis, it was decided to group the incisors and premolars together, because the numbers of missing teeth of these 2 types were very small. If a patient was missing one or more teeth of a certain type, that tooth type was counted as missing for that patient. This approach conforms with the current practice of using the individual patient or mouth as the basic independent investigatory unit, rather than each individual tooth, which has been deemed invalid.[4] Two examiners, whose assessments had been calibrated, examined all of the panoramic radiographs. A third examiner, whose assessments had been calibrated to those of the first 2 examiners, was consulted in case of disagreements; agreement was based on majority decision. To minimize bias, the clinical notes for each patient were consulted only after the radiographs had been reviewed.

Only panoramic radiographs that displayed the whole dentition without asymmetry, distortion or error in patient positioning were included in the study.

Differences between the patient groups were tested by chi-square analysis. Statistical significance was established as $p < 0.05$ with one degree of freedom ($\chi^2 = 3.84$).

Results

The proportions of patients in each year who were missing one or more teeth of each type are presented in **Fig. 1**.

Between 1983 and 1998 the proportion of patients with complete dentition, including third molars, rose significantly, from 36.0% to 45.1% ($\chi^2 = 10.43$; $p < 0.01$). This change was due to an increase in the proportions of patients retaining all first molars ($\chi^2 = 24.47$, $p < 0.001$), all second molars ($\chi^2 = 8.12$, $p < 0.01$) and all canines ($\chi^2 = 4.05$, $p < 0.05$). There was a slight increase in the proportion of patients retaining all incisors and a slight decline in the proportion of patients retaining all premolars, but these changes were not significant ($\chi^2 = 0.82$ and 0.12, respectively).

The prevalence of missing first molars was 10.5% and 3.2% for the 1983 and 1998 groups, respectively, whereas that for missing third molars was 13.5% and 17.9% and that for missing premolars was 1.9% and 2.4%, respectively; all of the differences were statistically significant ($p < 0.01$). Although the first molars, especially the lower first molars, were at greatest risk of being lost in both groups, the prevalence of missing first molars fell substan-

tially (10.5% in 1983, 3.2% in 1998); in contrast, the prevalence of missing premolars and third molars increased.

The increase in retention of first molars was reflected in significant increases in retention of both upper and lower teeth (**Fig. 2**; $\chi^2 = 9.85$; $p < 0.01$ and 67.13; $p < 0.001$, respectively). Although the difference in the proportions of patients with complete dentition had greater statistical significance when the third molars were excluded from the analysis ($\chi^2 = 41.51$; $p < 0.001$), the increase in the proportion with missing third molars was not statistically significant ($\chi^2 = 2.60$).

Discussion

Over the 15 years spanned by this study, the frequency of decayed, missing and filled teeth (DMFT) in 12-year-old Hong Kong Chinese patients dropped, from 1.5 in 1986 to 0.8 in 2001, which suggests a decrease in caries in this age group,[5] which is closest in age to those in the present study. This reduction could not have been a result of immigration, because the Chinese community in Hong Kong was largely closed to immigration from the end of the 1970s until unification in 1997. Another potential factor is water fluoridation, but because fluoridation was introduced in 1961,[6] both groups would have been optimally protected. Furthermore, in 1990 Lo and others[7] reported that 90% of caries observed in Hong Kong patients were of the pit and fissure type, the form least responsive to fluoridation. Therefore, the fall in DMFT, largely accounted for by a reduction in the loss of first molars, may reflect other oral improvements, such as the high prevalence (90%) of daily toothbrushing among all age groups.[6] There were only minimal losses of anterior teeth and premolars, which are exposed to a cariogenic environment for longer than the first molars, but this can be explained by the general observation that caries are more prevalent in molars.

There was an increase in prevalence of missing premolars and third molars, but the difference was significant only for premolars. The increase in the loss of premolars is indicative of an increase in orthodontic activity in Hong Kong. This activity is merited, as indicated by the finding of Wang and others[8] that although 30% of Hong Kong Chinese children require little or no orthodontic treatment, 37% have great or very great need of such treatment. Furthermore, the attitude toward and demand for orthodontic services among Chinese patients were similar to those of white patients.[8]

The increase in loss of third molars is indicative of the increased provision of oral surgery in Hong Kong. Singh and others[9] reported that both general dentists and oral and maxillofacial surgeons in Hong Kong removed significantly more asymptomatic impacted third molars than practitioners in Glasgow, Scotland. In light of 2 recent reports, the prophylactic removal of third molars in this Chinese community is appropriate. Chen and others[10] reported that ameloblastoma was found in 7.7% of biopsy samples obtained from 11- to 15-year-old Taiwanese Chinese patients; almost all of these lesions affected the posterior mandible and ramus. MacDonald-Jankowski and others[11] reported that over half of the mandibular ameloblastomas in this community were unicystic, and they were significantly associated with the crowns of unerupted teeth, particularly third molars and particularly in younger patients. Like Hong Kong, Taiwan is overwhelmingly populated by southern Han.[12]

The greater proportion of unicystic ameloblastoma among children during the 1990s relative to earlier decades could be related in part to the increased tempo of growth reported for Hong Kong adolescents between 1963 and 1993.[13] Although the effect of hormones on ameloblastoma per se remains to be determined, and a better understanding of its pathogenesis and immunohistochemistry is needed,[14] it is reasonable to assume that the change in growth rate could have had an effect. Nevertheless, because the birth rate in Hong Kong is falling,[15] the increased incidence of the unicystic form of ameloblastoma can be expected to afflict an increasing proportion of the children and young adults in the local population over the long term, although the overall number of cases may not change appreciably. The good news is that this form, particularly when it affects the mandible, can be effectively treated with relatively conservative therapy.

Although caution should be exercised in extrapolating observations from the Hong Kong Chinese to the Han in general, the ability of the Hong Kong Chinese to retain important elements of their traditional culture, largely lost on the mainland, could make this group a valuable model for the Chinese diaspora. ◆

Acknowledgement: *We are grateful to Professor Lakshman Samaranayake, dean of the faculty of dentistry, for sponsoring Dr. MacDonald-Jankowski's visit to the University of Hong Kong.*

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The authors have no declared financial interests.

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