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Author(s)	Ling, JYK; Wong, RWK
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Incisor Winging in Chinese

John Y.K. Ling[a] and Ricky W.K. Wong*[,b]

[a]*Honorary Associate Professor, Orthodontics, University of Hong Kong, Hong Kong*

[b]*Clinical Associate Professor, Orthodontics, University of Hong Kong, Hong Kong*

Abstract: *Aim*: To investigate the incisor wingings of the Southern Chinese and compare these with studies in different populations.

Materials and Methods: The maxillary and mandibular incisor alignment in study casts of an unselected sample from a 12 year old Hong Kong Oral Health Survey of 12 year old children (n=459; 295 boys and 164 girls) were studied.

Results: The prevalence of bilateral winging in the maxillary arch was 9% for males and 10% for females respectively. The prevalence of bilateral winging of the mandibular incisors was higher than the maxillary central incisors, at a prevalence of 22% for both sexes. Bilateral counter-winging of the central incisors was rare.

Conclusion: The prevalence of bilateral winging or mesio-palatal rotation of upper central incisors was between low and intermediate in the Southern Chinese. On the contrary, the prevalence of counter-winging was low.

Keywords: Incisor Winging, Southern Chinese.

INTRODUCTION

It is generally believed that the numerous morphological and alignment characteristics of the teeth are genetically determined [1, 2]. Detailed description and study of these traits could provide valuable information regarding phylogeny of man and distinctions between races and subraces [1, 3-12]. Features of tooth alignment which closely reflect genetic structure should be examined in determining the evolutionary (phylogenetic) relationships of populations and in establishing taxonomies that reflect these relationships [12]. Although tooth alignment may be an indicator of genetic distances between populations, it should be viewed with caution [11].

A wing-like appearance formed by maxillary incisors was observed among American Indians due to the rotation of these teeth in their sockets. The distal margins of the incisors are rotated in a labial or lingual direction. Labial rotation has been termed winging by Dahlberg [13], whereas lingual rotation has been termed counterwinging. The rotation may occur either unilaterally or bilaterally. The reverse condition is observed in human populations where the palates are high and narrow. This condition is found to exist in both crowded and uncrowded dentitions. The arch form and the palatal vault height may influence the position of teeth and pedigree studies show a consistent similarity of this trait in families, which suggests a genetic cause for this trait [13-15].

Dahlberg *et al*. [14] cited the works of Oshima [16] on a sample of 750 study casts and 500 dry skulls among Chinese males, with 4.4% and 5.3% rotation of the left and right maxillary central incisors respectively. He also found 3% bilateral winging of maxillary central incisors among Chicago Whites and 22% to 38% among Pima Indians. He devised a special angulator which showed the degree of rotation but commented that the readings may have little significance within one population.

Enoki and Nakamura [17] reported 9.64% of bilateral winging among 1,089 Japanese school children, females having a higher frequency (12%) than males (7%). Width of incisors, space availability, coronal and basal arch width were found to be unrelated to the rotations and they concluded that the genesis of this feature was not due to local factors or growth.

Rothammer *et al*. [18] measured mesiopalatal rotations of central incisors relative to the sagittal line of the maxilla. The angle measurements were performed with a specially adapted protractor. Fifty five per cent had winging, and no sex difference was found in the Chilean Indian population. A small statistically insignificant correlation was found between shovelling and mesiopalatal rotation of maxillary central incisors.

Moreover, lizuka [19] provided evidence that there are no significant relationships between bilateral winging and the mesiodistal dimension, maxillary protrusion, crowding and spacing. He measured the mesiopalatal rotation angle by Rothammer's method and found that the Japanese had a larger angle than the Pashtun and the frequency was higher as well.

Mayhall *et al*. [20] compared their results on the Burlington growth series of Canadian Caucasians for axial rotation of the incisors to the Chicago Whites of Dahlberg's [13]. They found a discrepancy of results in the frequency of bilateral winging, reporting a 15% in the Burlington series, while Dahlberg observed 43 % in his Caucasian sample. The difference was also noted of a 20% higher frequency of

*Address correspondence to this author at the 2/F, Orthodontics, Prince Philip Dental Hospital, 34 Hospital Road, Sai Ying Pun, Hong Kong;
Tel: 852 28590554; Fax: 852 25593803; E-mail: fyoung@hkucc.hku.hk

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straight alignment of the incisors in the Canadians but they offered no conclusive explanation.

The study of winging is important not only in anthropology but also in clinical orthodontics and aesthetic dentistry. Prasad *et al*. [21] reported a case of winged maxillary central incisors with unusual morphology and described its presentation and early orthodontic treatment.

'Southern Chinese' are defined as those Chinese whose ancestors originated from provinces south of the Yangtze River and they speak different dialects from the northerners. There is no study about the prevalent of incisor winging in this population.

The aim of our study is to investigate the incisor winging of the Southern Chinese and compare these with studies in different populations.

MATERIALS AND METHODS

Dental study casts (n=459; 295 boys and 164 girls) were obtained as part of a multi-disciplinary survey of cross-sectional, randomly selected sample of 1247 12-year-old Chinese children from the Oral Health Project in Hong Kong [22, 23]. Teeth found to be carious, missing, restored at the measurement landmark, hypoplastic, worn or malformed or orthodontically moved were excluded from the present investigation. Damaged casts which made the measurement data questionable were also omitted. Only study casts with permanent dentition were included in the study. The conditions of the incisor alignment were recorded according to the codes in Fig. (**1**).

RESULTS

Table **1** shows the prevalence of winging of central incisors in both arches. The prevalence of bilateral winging in the maxillary arch was 9% for males and 10% for females respectively. The prevalence of bilateral winging of the mandibular incisors was higher than the maxillary central incisors, at a prevalence of 22% for both sexes. On the contrary, bilateral counter-winging of the central incisors was rare. Only 1% of bilateral counter-winging of incisors was found in the male maxillary arch and 0.36% in the male mandibular arch. The counter-winging trait was not found in any female maxillary nor mandibular central incisors.

DISCUSSION

This young age group of Southern Chinese was chosen for measurement to minimize the alteration of the dental arch dimensions because of attrition, restoration or caries. Efforts

Winging Incisors				
Code	**Maxillary Centrals**		**Mandibular Centrals**	**Scores**
1		≤ 159°		1
2		≤ 160°		2
3		≤ 160°		3
4		161-179°		4
5		161-179°		5
0		180-190°		0
6		≥ 210°		6
7		≥ 210°		7
8		≥ 230°		8
9	Unrecordable		Unrecordable	9

Fig. (1). Coding of winging of the central incisors (modified from Dahlberg's classification).

Table 1. Prevalence (%) of Winging of Maxillary and Mandibular Central Incisors in 12 Year Old Southern Chinese Males (n = 282) and Females (n = 153)

	Males				Females			
	upper central incisors		lower central incisors		upper central incisors		lower central incisors	
Winging Trait	n	%	n	%	n	%	n	%
0	225	78	156	53	116	73	77	47
1	27	9	64	22	16	10	36	22
2	8	3	5	2	0	0	3	2
3	9	3	11	4	7	4	4	2
4	5	2	35	12	10	6	32	20
5	11	4	18	6	8	5	9	5
6	2	1	0	0	1	1	3	2
7	1	0	2	1	0	0	0	0
8	2	1	1	0	0	0	0	0

were made to ensure randomization and adequate sample size to ensure validity.

The aim of this study was to investigate the prevalence of various incisor winging alignment in Southern Chinese, which were never reported before. The study was not aimed to show differences or associations between different groups, therefore statistic analyses were not performed.

The Southern Chinese have a relative low prevalence (9%) of rotated central incisors known as bilateral winging, but a low prevalence of counter-winging in the maxillary arch when compared with Caucasians [15, 20]. This bilateral winging trait was commonly found in Mongoloid races (Table **2**). The reverse condition (counter-winging) was observed frequently in American Whites where the palates are high and narrow [13-15]. Compared to earlier studies by Oshima [16] on Chinese, the Southern Chinese had a higher prevalence of bilateral winging. The different tribes of American and Chilean Indians were among the highest ranked in the prevalence of bilateral winging of incisors in the maxillary arch. Scott and Turner [27] summarized the data and made the following subdivisions: Low frequency groups (0-15%) were Western Eurasia, Sub-Saharan Africa and Sahul-Pacific; Intermediate groups (15-30%) were East and Central Asia, American Arctic and Sunda-Pacific; High frequency groups (30-50%) were Northeast Siberia, Northwest North America, North and South America. According to this study, Southern Chinese was between low and immediate frequency groups for the upper incisors.

Several factors were thought to be of importance in the production of winging incisors, namely the tooth dimensions, alignment of incisors, dental arch size shape and sizes. However, no statistically significant correlations were found between the winging of central incisors and the above mentioned factors in a study of winging incisors in Pima Indians

Table 2. Comparison of Frequency of Occurrence of Rotation of Upper Central Incisors (Bilateral Winging), n = Number of Individuals, WT = Mesiopalatal Rotation, CWT= Mesiolabial Rotation

Ethnic Group	Author (year)	Sex	n	WT (%)	CWT(%)
Southern Chinese	Ling (Present Study)	♂ ♀	282 153	9 16	1 0
Chinese	Oshima [16] Cited by Dahlberg [15]		723	5.2	2.2
Japanese	Enoki *et al*. [17]		1089	9.6	13.9
Japanese	Izuka [19]		870	19	43.9
American Indians Pima Pima Pecos Pueblo	 Enoki & Dahlberg [17] Escobar [24] Nelson [25]		 864 648 122	 37 29.3 29.0	 8 0.02 -
Chile (Indians)	Rothammer *et al*. [18]	♂	73	56.0	-
Easter Islanders	Turner & Scott [26]		118	11.9	4.2
Chicago Whites	Dahlberg [15]		200	6.0	50.0
Canadian Whites	Mayhall *et al*. [20]	♂ ♀	128 131	3.9 4.6	14.1 15.3

by Escobar [24]. Thus, further studies in Mongoloid populations are recommended to associate the rotation of the central incisors with mesiodistal dimensions, dental arch widths, spacing conditions, morphology of the incisors, coronal and basal arch widths and bizygomatic and bicondylar widths.

CONCLUSION

The prevalence of bilateral winging or mesio-palatal rotation of central incisors was between low and intermediate (maxilla 9%; mandible 22%) in the Southern Chinese. Only 1% of counter-winging or mesio-labial rotation of the maxillary central incisors and none in the mandibular central incisors were found in the Southern Chinese.

REFERENCES

[1] Moorrees CFA. The Aleut dentition. Cambridge: Harvard University Press 1957.

[2] Lundstrom A. Tooth morphology as a basis for distinguishing monozygotic and dizygotic twins. Swed Med Res Counc 1962; 34-43.

[3] Hrdlicka A. Shovel-shaped teeth. Am J Phys Anthropol 1920; 3: 429-66.

[4] Hrdlicka A. Further studies of tooth morphology. Am J Phys Anthropol 1921; 4: 141-76.

[5] Dahlberg AA. The dentition of the American Indian. In: Dental anthropology. Papers on the physical anthropology of the American Indian. Laughlin WS, Ed. Fourth Viking Fund summer seminar. New York: The Viking Fund, Inc. 1951; 138-76.

[6] Lasker GW. Observations on the teeth of Chinese born and reared in China and America. Am J Phys Anthropol 1945; 3: 129-50.

[7] Lasker GW. Genetic analysis of racial traits of the teeth. Cold Spring Harbor Symposia on Quantitative Biology, XV 1951; 191-203.

[8] Tratman EK. A comparison of the teeth of people: Indo-European racial stock with the Mongoloid. Dent Rec., LXX: 1950; 63-88.

[9] Moorrees CFA. Genetic considerations in dental anthropology. Genet Dent Health 1962; 101-12.

[10] Carbonell VM. Variations in the frequency of shovel-shaped incisors in different populations. In: Dental Anthropology. Brothwell DR, Ed. Symposia of the society for the study of human biology. Pergamon Press: New York 1963; Vol. 5.

[11] Palomino H, Chakraborty R, Rothammer F. Dental morphology and population diversity. Hum Biol 1977; 49: 61-70.

[12] Greene DL. Genetics, dentition, and taxomony. Univ Wyom Pub 1967; 33: 93-168.

[13] Dahlberg AA. Analysis of the American Indian dentition. In: Dental Anthropology. Brothwell DR, Ed. London: Pergamon 1963a; pp. 149-77.

[14] Dahlberg AA. Rotated maxillary central incisors. Part I. Rfotated maxillary central incisors among various tribes of American Indians. J Jap Orthod Soc 1958; 17: 157-69.

[15] Dahlberg AA. A wing-like appearance of upper incisors among American Indian (Abst.) - J Dent Res 1959; 38: 203-4.

[16] Oshima S. Ueber die Zahnanomalie der Chinesen. J Orient Med 1937; 26: 1010-26. [Cited by Dahlberg AA (1958)]

[17] Enoki K, Nakamura E. Bilateral rotation (mesio palatal torsion) of maxillary central incisors (Abst). J Dent Res 1959; 38: 204.

[18] Rothammer F, Lasserre E, Blanco R, Covarrubias E, Dixon M. Microevolution in human children populations. IV. Shovel shape, mesio-palatal version and other dental traits in Pewenche Indians. Z Morph Anthropol 1968; 60: 162-9.

[19] Iizuka. The bilateral mesiopalatal rotation of upper central incisors. J Anthropol Soc Nippon 1976; 84: 31-47.

[20] Mayhall JT, Saunders S, Belier PL. The dental morphology of North American Whites : A reappraisal. In: Kurtn, Ed. Teeth: form, function and evolution. New York: Columbia Univ Press 1982; pp. 245-58.

[21] Lee GTR, Goose DH. Heritability of dental occlusal variables in a family study in Liverpool, U.K. Arch Oral Biol 1972; 27: 987-9.

[22] Ling JYK. A morphometric study of the dentition of 12-year-old Chinese children in Hong Kong: The University of Hong Kong 1992.

[23] King NM, Ling, BV. The dental caries status and dental treatment patterns of 12-year-old children in Hong Kong. J Dent Res 1986; 65: 1371-4.

[24] Escobar VH. A genetic study of upper central incisors rotation (wing teeth) in the pima indians. Thesis. Indiana Univ 1979; pp. 5-238.

[25] Nelson CT. The teeth of the Indians of Pecos Pueblo. Am J Phys Anthropol 1938; 23: 261-293.

[26] Turner CG, Scott GR. Dentition of Easter Islanders. In: Dahlberg AA, Graber TM, Eds. Orofacial Growth and Development. Hague: Mouton Publishers 1977; pp. 229-49.

[27] Scott GR, Turner II CG. Geographic variation in tooth crown and root morphology. In Scott and Turner, Ed. The anthropology of modern human teeth. Cambridge: Cambridge Univ Press 1997; pp. 178-81.

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