COMPARISON OF NASOLABIAL ANGLE IN YOUNG ADULTS AND MIDDLE AGED DENTATE AND ELDERLY EDENTULOUS SUBJECTS

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ABSTRACT

Objective: To compare the mean value of nasolabial angle in dentate and edentulous subjects in young adults, middle aged dentate (having normal occlusion) and elderly edentulous subjects.

Study Design: Cross-sectional comparative study

Place and Duration of Study: The study was conducted in the Department of Prosthodontics, Armed Forces Institute of Dentistry, and Army Medical College, Rawalpindi from September 2007 to November 2008.

Patients and Methods: A total of 250 subjects were divided in three age groups. Group 1: 100 Subjects 20–30 years , Group 2: 100 subjects 35-45 years and Group 3: 50 edentulous subjects >50 years. The subjects with Intact maxillary and mandibular arches and Angle's Class-I molars, canine and incisor relationship were included. Standard lateral cephalometric radiographs of the heads were traced and nasolabial angle was measured.

Results: The mean values of nasolabial angle in dentate and edentulous were 96.79°±2.6 and 111.40o±2.51respectively. The mean values of nasolabial angle in young adults (20-30 years), middle aged (35-45 years) and old edentulous (>50 years) subjects were 97.39o±2.94, 96.19o±2.58 and 111.40o±2.51respectively. The difference in mean values of nasolabial angle among three groups, was statistically significant ($p<0.001$).

Conclusions: Nasolabial angle in middle aged subjects is greater than younger subjects and even greater in elderly edentulous subjects. Sexual dimorphism exists as males have greater nasolabial angle in younger age. While fabricating dental prosthesis nasolabial angle may be restored near to the dentate subjects.

Keywords: Cephalometry, Soft tissue, Complete denture

INTRODUCTION

The lower one-third of the face has major impact on facial appearance and profile, which seems to be adversely affected in edentulous subjects as maxillary lip is no more supported by teeth[1]. This situation is even verse if the residual arches are excessively resorbed.2 When complete dentures are fabricated, it remains a challenge to re-establish lip support and restore the facial profile[2]. In prosthesis fabrication, anterior artificial dental arch, denture flange and appropriate occlusal vertical dimension are important factors in successfully restoring the esthetic objective[3].

The presence and position of anterior artificial dental arches affect not only the lip contour but also the lower half of the nose. The nasolabial angle and lip position are useful indices for examining lip support in denture wearers[4]

The nasolabial angle is a clinical and cephalometric parameter for the determination of soft tissue profile,[4] which is representative of maxillary inclination, increased angle reflects a maxillary retrusion, and decreased amount shows a maxillary protrusion[5]. Owen[6] reported its arbitrary value to be in the range of 90° to 110° (considered as the standard) McNamara Jr.[7] reported a value of 102°± 8 in cephalometric evaluations. However, study on Brazilian black showed a mean value of 88.14o and 104° ± 11.5° 9 and 114° ± 10° in young white adults, suggesting ethnic variations[8].

Different ethnic groups demonstrate variations in their skeletal, dental and facial profiles and a better treatment plan can be formulated if these racial variations are considered in the diagnosis[9].

Individuals from our population present craniofacial characteristics which differ from those of other races, especially the white race,

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Received: 09 Feb 2010; Accepted: 23 April 2010

whose cephalometric analyses and norms are usually considered as the standard. Our study was conducted to establish the norm of our population by assessing the mean values of nasolabial angle in young adults, middle aged and edentulous subjects, and to assess the effects of age on nasolabial angle along with sexual dimorphism.

PATIENTS AND METHODS

This cross-sectional comparative study was conducted in Department of Prosthodontics, Armed Forces Institute of Dentistry, and Army Medical College, Rawalpindi from September 2007 to November 2008.

250 subjects were divided in three age groups. 100 dentate subjects with 20–30 years were included in Group 1. In Group 2, 100 subjects with 35-45 years were included and Group 3 consisted of 50 edentulous subjects above 50 years. The subjects with Intact maxillary and mandibular arches and Angle's Class-I molars, canine and incisor relationship were included in the study while the subjects with history of orthodontic treatment or maxilomandibular defect were excluded from the study.

Standard lateral cephalometric radiographs of the heads were obtained using standard cephalostat. The cephalograms were divided in two groups according to gender (male and female). In a dark room, a single operator traced all the cephalograms by using a transparency viewer. Templates were used for comparison. Intra operator accuracy was improved by repeating measurements after 10 days. The nasolabial angle was measured as the angle between the line tangent from the Subnasale (Sn) to the lower border of the nose and the line from the Sn to maxillary lip (Fig)

Data had been analyzed using SPSS Version 15. Descriptive statistics were used to describe the data. Analysis of variance (ANOVA) was used to compare nasolabial angle between the groups. p-values < 0.05 was considered as significant.

RESULTS

In our study, out of 250 subjects, 128 (51.2%) were males and 122 (48.8%) were females. All the groups were comparable with respect to gender (p>0.05) (Table-1). The mean values of nasolabial angle in dentate and edentulous were 96.79°±2.6 and 111.40°±2.51 respectively. The difference was statistically significant (P<0.001). The mean values of nasolabial angle in group 1, group 2 and group 3 were 97.39° ± 2.94, 96.19°±2.58 and 111.40°±2.51 respectively. ANOVA showed statistically significant difference in the mean values of nasolabial angle among three groups (p<0.001) post hoc analysis, showed that there is significant difference between group 1 & group 2 (p>0.001), group 1 & group 3 (p<0.001) and group 2 & group 3 (p<0.001). Amongst each group male and female showed sexual dimorphism. In group 1 mean nasolabial angle was 98.48±2.51in males while in female it was 96.10±2.90. In group2 mean nasolabial angle was 95.92±2.43 in males while in females it was96.46±2.71. In group3 mean nasolabial angle was 112.83±2.09 in males while in female it was110.07±2.13.

p-values of gender comparisons between the groups has been shown in Table 2

DISCUSSION

Owen[6] reported racial differences of the nasolabial angle in the facial appearances of dentate subjects, ranging in age from 18 to 41

Table 1: showing gender distribution of nasolabial angle.

Age Groups	Group Mean Nasolabial Angle (Degree)		Frequency (n)	Percentage (%)	Mean Nasolabial Angle (Degree)	S. D +	Minimum (Degree)	Maximum (Degree)
Group 1 (n=100)	97.39± 2.94	Male	54	54	98.48	2.51	93	102
		Female	46	46	96.10	2.90	92	102
Group 2 (n=100)	96.19± 2.58	Male	50	50	95.92	2.43	92	102
		Female	50	50	96.46	2.71	92	102
Group 3 (n=50)	111.40± 2.51	Male	24	48	112.83	2.09	108	115
		Female	26	52	110.07	2.13	108	115

Table 2: Gender comparison between groups

Comparison (Mean)	P value
Gp1 male vs. gp2 male	P<0.001
Gp1 male vs. gp3 male	P<0.001
Gp2 male vs. gp3 male	P<0.001
Gp1 female vs. Gp2 female	P>0.05
Gp1 female vs. Gp3 female	P<0.001
Gp2 female vs. Gp3 female	P<0.001

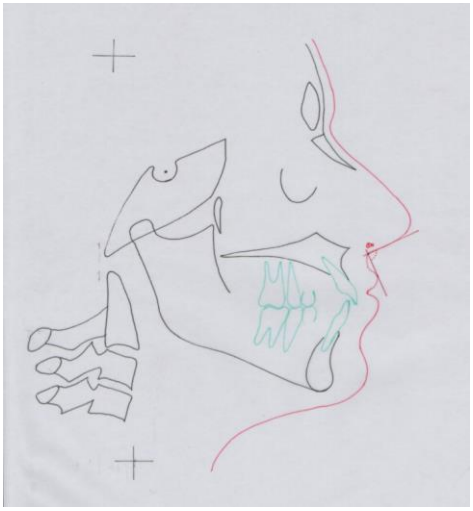

Figure: Cephalometric tracing

years, from six racial groups, including Japanese. They evaluated that Japanese had a smaller nasolabial angle (97°±1) than did Caucasians (109°±5) and Hispanics (105° ±1), but a larger angle than did Koreans (92° ±9), Chinese (92°±5) and African Americans (90°). According to our study the dentate subjects between 20 to 45 years showed mean nasolabial angle of 96.79° with standard deviation±2.6, this value is very close to that of Japanese.

The related literature indicates that the value of the nasolabial angle in harmonious faces varies considerably. Among the cited values are 114.08° ± 9.58°; 102°; 105° ± 8°; 111.04°; 104° ± 11.5° and from 108.76° to 114.40°.9

Kamashita et al[3] conducted a study using waxed dental rims at different angles, representing anterior dental arch. He concluded that recovery of lip support with dentures could reduce the larger nasolabial angle that results from the loss of lip support owing to missing teeth to the level of that in dentate groups.

Watt and MacGregor10 stated that the nasolabial angle for adequate lip support is approximately 90° in fabricating complete dentures. Brunton and McCord[11] have reported that the nasolabial angle of Caucasian dentate subjects is approximately 110° and edentulous patients should be given an obtuse nasolabial angle exceeding 90° as a prosthodontic guideline. We found similar results in our study that optimal aesthetic results from a prosthesis may be achieved if nasolabial angle be restored near to the dentate i.e. 96.79° ±2.6

According to Hwan WJ[12] the average nasolabial angle was 78.5o in young Korean males and 126° in young Korean females showing sexual dimorphism, we also found sexual dimorphism in our study in younger groups as males are more prognathic than females but in middle age groups the females are slightly more prognathic than males which is in accordance with another study conducted by Sheikh and Alvi[13] according to whom females showed more dental protrusion. Silva Filho et al[4] found an angle of 104° ± 11 in white individuals with normal occlusion, without sexual dimorphism.

The nasolabial angle presented variation according to gender; in females it was significantly smaller, confirming the existence of sexual dimorphism. This result differs from those of Silva Filho et al.[4] and Fitzgerald et al.[14] who found that black individuals showed similar angular and linear measurements in both groups, males and females. According to Prahl-Andersen et al.[15] the tendency of the nasolabial angle is, to decrease with age, specially until adolescence, when the growth of nose, chin and lips is expressed more intensely[9].

Silva Filho et al[4] observed that craniofacial growth did not alter the nasolabial angle significantly. Prahl-Andersen et al[15] observed a small decrease in the value of the nasolabial angle with age, but with subsequent stabilization of this value in adolescence.

Siqueira et al[16] studied the changes of the nasolabial angle as a result of deviations in the

upper incisors position induced by craniofacial growth. It was concluded that facial and dental alterations that occurred during the craniofacial growth in Brazilian white youths did not influence the nasolabial angle significantly[9].

Nanda et al[17] reported that the nasolabial angle decreased slightly from 7 to 18 years of age in both genders with means at 7 years , 107.8 o ± 9.4 for boys and 114.7 o ± 9.5 for girls. At 18 years, the means were 105.8 o ± 9.0 for males and 110.7 o ± 10.9 o for females. Lo and Hunter18 found no significant changes in nasolabial angle because of growth.

Scheideman et al[19] and Fitzgerald et al[14] conducted longitudinal studies and reported a normal mean nasolabial angle at 111.4° with a small decrease in this angle expected with age, primarily because of the downward growth of the nose. In our study we found slight acute nasolabial angle in middle aged subjects as compared to the young ones suggesting decrease in nasolabial angle with age. It may be because of proclination of maxillary anterior teeth or the continued nasal growth.

CONCLUSIONS

Nasolabial angle in middle aged subjects is greater than younger subjects and even greater in elderly edentulous subjects. Sexual dimorphism exists as males have greater nasolabial angle in younger age. While fabricating dental prosthesis nasolabial angle may be restored near to the dentate subjects

ACKNOWLEDGEMENTS

This study project was completed with financial grant of Higher education commission, R&D Department and National University of sciences and technology, R&D department, Islamabad.

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