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Evaluation of ANB angle in Rajasthan population: A clinical study

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Abstract
Background: Cephalometric techniques are now used routinely not only by orthodontist but also by maxillofacial and plastic surgeons while performing orthognathic surgical and cosmetic procedures. The ANB angle is frequently used in the assessment of anteroposterior upper and lower jaws relationships. Hence; the present study was undertaken for assessing ANB angle in Rajasthan population.
Materials and Methods: A total of 200 subjects who came for routine dental check-up were enrolled. Complete demographic details of all the subjects were obtained. Performa was made and complete medical history of all the subjects was recorded. Radiographs were taken in all the subjects and Cephalometric analysis was carried out. Patients with history of any other systemic illness, presence of any bone metabolic disorder of any osseous deformity were excluded from the present study.
Results: Overall, mean ANB angle was found to be 2.6. Among males and females, mean ANB angle was found to be 2.9 and 2.4 respectively. Although non-significant, ANB angle was slightly higher among males.
Conclusion: During cephalometric assessment of the sagittal relationship between the maxilla and mandible, clinicians should consider evaluating ANB angle.

Keywords: ANB angle, cephalometric

Introduction

Cephalometric techniques are now used routinely not only by orthodontist but also by maxillofacial and plastic surgeons while performing orthognathic surgical and cosmetic procedures. Numerous research and clinical reports on cephalometrics have appeared in the literature as a diagnostic tool for treatment planning, as a communication tool, and as a research tool for studying dentofacial growth and development and for the interpretation of treatment results. Hence, the purpose of basic cephalometric analysis is to characterize or describe the pertinent features of the individual and to establish a classification system through the division of values into specific quantities. Quantification, thus, provides a means of communication of the problems; therefore, analysis can be employed to describe, compare, classify, and communicate the nature of orthodontic and orthopedic problems [1- 3].

The ANB angle, defined by Steiner, is frequently used in the assessment of anteroposterior upper and lower jaws relationships. The angle between the planes crossing the nasion-A points and nasion-B points is called the ANB angle. Previous authors suggested that the antero-posterior and vertical position of the nasion point and the rotational changes of the jaws influence the reliability of the ANB angle and thus recommended the use of Wits appraisal. Contrary to other parameters, Wits appraisal is not related to the skull base and nasion point. Instead, this measure-ment is defined as the distance between the lines drawn from the A and B points coming perpendicular to occlusal plane [4-7]. Hence; the present study was undertaken for assessing ANB angle in Rajasthan population.

Materials and Methods

The present study was conducted with the aim of assessing ANB angle in Rajasthan population. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 200 subjects who came for routine dental check-up were enrolled. Complete demographic details of all the subjects were obtained. Performa was made and complete medical history of all the subjects was recorded. Radiographs were taken in all the subjects and Cephalometric analysis was carried out. Patients with history of any other systemic illness, presence of any bone metabolic disorder of any osseous deformity were excluded from the present study. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Mann-Whitney U test was used for evaluation of level of significance.

Results

Mean age of the subjects was 43.5 years. 57 percent of the subjects belonged to the age group of more than 40 years. 53.5 percent of the subjects were males while the remaining were females. 39.5 percent of the subjects were of rural residence. Overall, mean ANB angle was found to be 2.6. Among males and females, mean ANB angle was found to be 2.9 and 2.4 respectively. Although non-significant, ANB angle was slightly higher among males.

Table 1: Demographic data

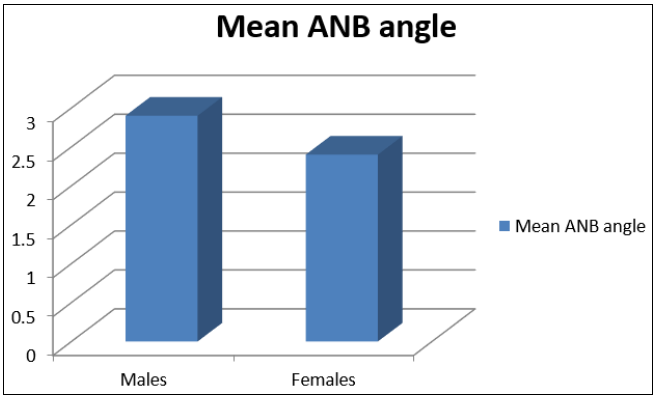
Variable		Number of patients	Percentage
Age group (years)	Less than 40	86	43
	More than 40	114	57
Gender	Males	107	53.5
	Females	93	46.5
Residence	Rural	69	39.5
	Urban	131	60.5

Table 2: ANB angle

ANB angle	Value
Mean	2.6
Minimum	-1.1
Maximum	7.2

Table 3: Comparison of ANB angle between males and females

Gender	Mean ANB angle
Males	2.9
Females	2.4
p- value	0.75



Graph 1: ANB angle among subjects divided on the basis of gender

Discussion

Linear and angular measurements have been incorporated by researchers to get an accurate method to assess sagittal base discrepancy. Till date, various parameters have been constructed like: A-B plane angle, ANB angle etc [6- 10].

In the present study, mean age of the subjects was 43.5 years. 57 percent of the subjects belonged to the age group of more than 40 years. 53.5 percent of the subjects were males while the remaining were females. 39.5 percent of the subjects were of rural residence. Sherman *et al* noted that changes in the Wits appraisal occurring during growth are not necessarily due to changes in the sagittal jaw relationship and are liable to be affected by changes in the angulation of the occlusal plane. There is also an influence of the occlusal plane angle and facial height on the ANB angle assessment. Also, the Wits appraisal is influenced by the occlusal plane angle [11].

In the present study, overall, mean ANB angle was found to be 2.6. Among males and females, mean ANB angle was found to be 2.9 and 2.4 respectively. In another study conducted by Bhattacharya A *et al*, authors investigated the role played by the cranial base flexure in influencing the sagittal and vertical position of the jaws in Indian population. Lateral cephalograms of 108 subjects were divided into three categories (Group A: NSAr > 125°, Group B: NSAr-120°-125°, Group C: NSAr < 120°) according to value of NSAr. Measurement of eight angular (SNA, SNB, NPg-FH, ANB, NAPg, SN-GoGn, Y-Axis, ArGo-SN) and seven linear (N-S, S-Ar, Ar-N, Ar–Pt A, Ar–Gn, Wits appraisal, N- Pt A) variables were taken. Pearson correlation coefficient test was used to individually correlate angular and linear variables with NSAr for the whole sample as well as in individual group. Their study showed cranial base angle has a determinant role in influencing the mandibular position and it also affects both the mandibular plane angle and y-axis [12].

In the present study, although non-significant, ANB angle was slightly higher among males. Prasad M *et al* established the norms of Beta angle to assess the sagittal discrepancy for Nellore district population. One hundred and fifty pretreatment cephalometric radiographs (50 each of Class I, II, and III) were subdivided based on ANB, Wits appraisal, and Beta angle into skeletal Class I, II, III. There was statistically significant difference for, the mean values and the standard deviation for Beta angle within the three skeletal patterns (Class I, Class II and Class III skeletal patterns).[13] Riedel used Nasion (N) to define skeletal relationship between maxilla and mandible with ANB angle but later on Jacobson discovered few limitations in that analysis. He explained the possibility of errors in ANB angular measurement with the displacement of nasion and jaw rotations. Thus, he suggested the use of functional occlusal plane rather than cranial base in his analysis known as Wit's Appraisal [14, 15]

Conclusion

From the above results, the authors concluded that during cephalometric assessment of the sagittal relationship between the maxilla and mandible, clinicians should consider evaluating ANB angle.

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