CO-RELATION BETWEEN ANB ANGLE, WITS VALUE & SNP PLANE ANGLE

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ABSTRACT

ANB angle & Wits value are used to asses the Sagital pattern of the patient cephalometrically. The two variables are dependent on change in the Antero-posterior & vertical position of Point A. SNP plane angle determines the rotation change in position of Palatal plane with reference to SN plane. This rotational change might have an impact on the position of point A and thus the ANB angle and wits value. Aim of the study was to establish correlation between ANB, Wits Value & SNP plane angle. Study was conducted on 60 subjects and following conclusions were drawn. 1. Statistically significant correlations was found between ANB angle & Wits Value 2. Statistically insignificant correlation was found between SNP plane angle and ANB & Wits Value suggesting that rotational change in this Palate with reference to SN plane has no impact on the sagital assessment parameters 3. Statistically significant correlations was found between <SNP & <SNM.

Key words: *ANB angle, Wits Value, SNP Palatal Plane*

INTRODUCTION

ANB Angle has been used to assess the Sagital Pattern of the patient. Its normal value is 0-4^0. Value between this range is indicative of Skeletal Class I, value greater than 4^0 is suggestive of Skeletal Class II while value less than 0^0 is suggestive of Skeletal Class III[1,2]. Following factors however have been reported to affect the ANB angle: 1. The patient's age 2. The change of the spatial position of the nasion either in the vertical or anteroposterior direction 3. The upward or downward rotation of the SN line 4.The upward or downward rotation of the Jaws 5.The change in the angle SN to the occlusal plane 6. The degree of facial prognathism and 7. Recording Errors[3,4].

Jacobson A[5,6] considering the limitations of ANB angle, developed a new sagittal discrepancy indicator i.e. Witts Appraisal[7]. This method entails drawing perpendiculars on a lateral cephalometric tracing from points A and B respectively, onto the functional occlusal plane (i.e. points OA & OB respectively). The average value for the Wits (OA-OB distance) is -1 mm in males and 0 mm in females. In skeletal Class II jaw dyplasias, point OB would be located well behind point OA (a positive reading) whereas in skeletal Class III jaw disharmonies, the "Wits" reading would be negative. This Sagittal indicator is thus not depended on the anteroposterior position of Nasion & rotation of mandible.

Some attempts have been made to predict the Wits appraisal from the ANB angle Chandra PK, Godfrey K[8] in their cephalometric study consisting of thirty three orthodontic patients (13-15 years) evaluated & found:. 1. the relationship between angle ANB and Wits appraisal (r = 0.95 when mandibular plane angle is within normal limits of 32 +/- 5); 2. Predict angle ANB from Wits appraisal and vice versa (which was 90 percent correct in mesofacial type and obtained by the regres-

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sion equation: angle ANB = 2.31 + 1.00 x Wits value; and 3. the validity of angle ANB compared to other methods (angle ANB 78.5 percent in agreement with the standard followed by Wits 64.28 percent).

Though attempts have been made to find other sagital assessment parameters[9,10,11,12] but ANB Value & Wits Value are thus among the most reliable parameters used to assess the Sagital Discrepancy. SN-Palatal Plane[1] has been used in literature to study the impact of rotation of palatal plane on the vertical pattern of the patient. Its normal value is 6 ± 4^0. Aim of this study was to find out the effect of SN-Palatal plane angle change on Point A & thus on ANB angle & Wits value and to establish correlation between them.

METHODOLOGY

The study was conducted on 60 subjects (30 females, 30 males) with age range of 12-30 years who reported at de'Montmorency College of Dentistry & Faculty of Dentistry, The University of Lahore. Subjects having supernumerary or congenitally missing teeth, already undergoing with orthodontic treatment and Syndromes, were excluded from the study. Sample was collected using the non-probability convenience sampling technique.

Lateral Cephalogram was taken in natural head position for each subject. Lateral Cephalogram was then traced and analyzed for each patient. SNA Angle ($80\text{-}84^0$), SNB Angle ($78\text{-}82^0$), ANB Angle ($0\text{-}4^0$), Wits Value (0,-1 mm), SN Mandibular Plane Angle ($32^0\pm4$) and SN Plane to Palatal Plane Angle (<SNP $6^0\pm4$) were calculated on Cephalogram and correlation was established between ANB angle, Wits Value & SNP plane angle.

STATISTICAL METHOD

SPSS 11.0 was used for statistical evaluation.

1. Mean, Standard Deviation, Variance, Minimum & Maximum value and Range were calculated for each parameter for each subject.
2. Correlation coefficients between the various parameters were calculated using Pearson's correlation.

RESULTS

The study was conducted on 60 subjects (30 females & 30 males) with mean age 18.43 ± 4.21. Descriptive Statistics were calculated for each variable for each subject as shown in Table 1.

Statistically significant and highly correlated relationship was found between the ANB angle & WITS Value (r=0.85), however neither of the two parameters used to assess the Sagital pattern are effected by the change in SNP Plane Angle as shown in the Table 2.

It is also worth mentioning that SNP plane angle is statistically significantly correlated with the SNM plan angle the parameter used to as the vertical pattern of the patient as shown in the Table 2.

TABLE 1: DESCRIPTIVE STATISTICS

	Minimum	Maximum	Mean	Std deviation
AGE	12.00	30.00	18.4333	4.2080
SNA	70.00	92.00	81.2333	4.2878
SNB	70.00	88.00	77.3833	4.0457
ANB	-9.00	10.00	3.7333	3.7195
WITS	-8.00	7.00	.8083	3.2509
SNM	19.00	54.00	33.8667	7.6534
SNP	1.00	17.00	8.2417	3.6424

N=60 (Entire Data)

TABLE 2: CORRELATION BETWEEN ANB, WITS VALUE & SNP-PLANE ANGLE

		WITS	SNM	SNB
ANB	Pearson Correlation	.850**	.008	.199
WITS	Pearson Correlation		-.031	.189
SNM	Pearson Correlation			.303*

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

DISCUSSION

Study was aimed at establishing correlation between the parameters used to assess the Sagital pattern of the patient i.e. ANB angle & Wits value and the SNP Plane angle.

ANB angle & Wits value have statistically significant correlation among them i.e r=0.85 (Table 2). Both

are however dependent on the position of Point A. Change in Spatial or vertical position of Point A effects the value of ANB angle and Wits value thus limiting the information regarding sagital pattern assessment to some extent.

SNP plane angle determines the angle between SN plane & Palatal Plane. Its normal value is $6^0 \pm 4$. Its value for the sample used was however $8.24^0 \pm 3.6$ (Table 1). Change in SNP plane angle effects the position of Point A due to rotational change in the position of Maxilla thus suggesting that this rotational change in position of maxilla with reference to SN plane might also affect the ANB angle & Wits value. Coefficient of correlation (r) was calculated to establish any correlation between the variables. Statistically insignificant correlation was found between ANB angle, Wits value and SNP plane angle thereby suggesting that rotational change in the position of Palatal plane with reference to SN plane do not effect the position of Point A to an extent that it can affect the Sagital pattern assessment parameters (Table 2).

It is also worth mentioning that rotational change in the position of palate with reference to SN plane does effect on the SN –Mandibular plane angle used to asses the vertical pattern of the patient. Correlation was established between the two variables and statistically significant co-relation was found between the two (Table 2).

CONCLUSION

Following conclusions can be drawn from this study:

1. Statistically significant correlations was found between ANB angle & Wits Value
2. Statistically insignificant correlation was found between SNP plane angle and ANB & Wits Value suggesting that rotational change in this Palate with reference to SN plane has no impact on the sagital assessment parameters
3. Statistically significant correlations was found between <SNP & <SNM.

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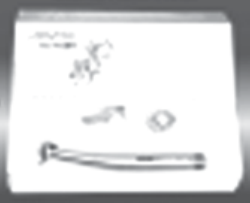

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