UTILITY OF BETA ANGLE IN ASSESSING THE SAGITTAL SKELETAL DISCREPANCY - A CEPHALOMETRIC STUDY

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Of the three dimensions, sagittal discrepancies are more commonly encountered in day to day practice, The purpose of the study was to assess the Beta angle. Pretreatment lateral cephalograms of 100 young adults (50 men and 50 women) were divided into skeletal Class I, Class II and Class III. The Data was subjected to statistical analysis using the Statistical software namely SPSS 11.0 and Systat 8.0. The results of the present study showed that the mean Beta angle of 32.54 ± 0.86. There was statistically insignificant difference in Beta angle of male and female. A more acute Beta angle indicates Class II skeletal pattern, and a more obtuse Beta angle indicates Class III skeletal pattern.

Key words: Sagittal discrepancies; Beta angle.

Assessing the sagittal relationship is a challenging issue in orthodontics. The ANB angle has been recognized as a skeletal sagittal discrepancy indicator and has become the most commonly used measurement since time.[1] More recently, it has been claimed that the ANB angle is affected by several environmental factors.[2,3,4,5] A second widely used measurement, the Wits appraisal, was introduced by Jacobson to overcome problems related to the ANB angle[5]. In Wits appraisal, accurate identification of the occlusal plane is not always easy or accurately reproducible. Freeman[6] described a method to evaluate the anteroposterior denture base relationship that aimed at eliminating point N for a more accurate evaluation. Although the AFB angle may not be affected by the vertical displacement of point A, it may be affected by the vertical positioning of point B. Chang 2 reported a linear measurement of the distance between points A and B projected onto the Frankfort horizontal plane. This method eliminates nasion as in the Wits appraisal and AFB angle, and may not be affected by the vertical displacement of point A or point B along the point A or B vertical. Chong Yol Baik introduced Beta angle[7] which does not depend on any cranial landmarks or dental occlusion to assess the sagittal jaw relations. Such a measurement was recently developed and named the *Beta* angle. Hence the objective of this study was to assess the Beta angle.

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METHODOLOGY

Pretreatment Lateral cephalograms of 100 young adults (50 men and 50 women) were chosen randomly from departmental case records of V.S. Dental College and Hospital. The cephalometric tracing was done onto acetate tracing paper using 4H pencil. Subjects were divided into Skeletal Class I, Class II and Class III according to Chong Yol Baik and Maria Ververidou7. All subjects selected were Indian, 18 years and above, had never undergone orthodontic treatment. The Data was subjected to statistical analysis using the software namely SPSS 11.0 and Systat 8.0. Microsoft word and Excel have been used to generate graphs and tables.

ASSESSMENT OF ERROR

20 lateral cephalograms were selected at random and were retraced evaluate the intra and inter operator reliability. The error is calculated using Dahlberg's Reproducibility co efficient:

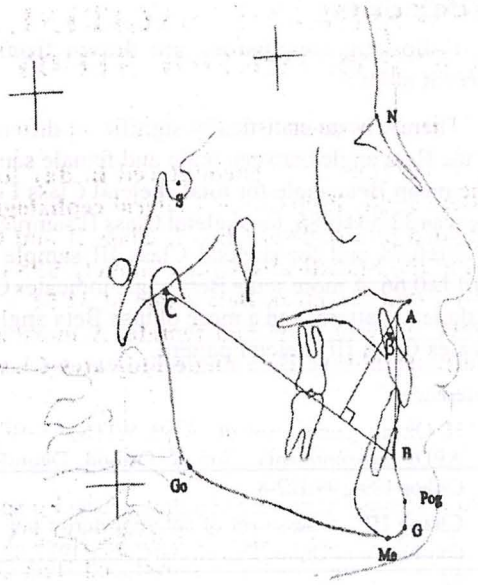


Fig.1 Cephalometric Measurement - Beta Angle

$$MethodError = \sqrt{\frac{\sum di^2}{2n}}$$

RESULTS

There was statistically insignificant difference in the mean value of the Beta angle of the sexes within the groups (Table 1). The mean Beta angle for male skeletal Class I sample was 32.38 with a standard deviation of 1.62, skeletal Class II sample was 28.81 with a standard deviation of 1.39 and for skeletal Class III sample was 40.11 with a standard deviation of 1.32. The mean Beta angle for female skeletal Class I sample was 32.63 with a standard deviation of 1.03, skeletal Class II sample was 30.05 with a standard deviation 0.74 and for skeletal Class III sample was 40.40 with a standard deviation 0.51. The mean Beta angle for total skeletal Class I sample was 32.54 with a standard deviation of 0.86, skeletal Class II sample was 29.50 with a standard deviation 0.74 and for skeletal Class III sample was 40.17 with a standard deviation 1.44. (Table 2).

TABLE 1: COMPARISON OF BETA ANGLE OF MALE AND FEMALE

Parameter	Skeletal Classification	Male	Female	Student t	P value
		Mean+SE	Mean±SE		
Beta angle	Class I	32.38±1.62	32.63±1.03	0.140	0.890
	Class II	28.81±1.39	30.05±0.74	0.828	0.411
	Class III	40.11±1.32	40.40±0.51	0.112	0.912
Pair wise significance		Class I- Class II; P=0.334	Class I-Class III; P=0.012		
		Class II-Class III; P<0.001	Class I- Class II; P=0.100		
		Class I-Class III; P=0.001	Class II-Class III; P<0.001		

TABLE 2: COMPARISON OF BETA ANGLE IN CLASS I CLASS II AND CLASS III.

Pair	Student t	P value
Class I vs Class II	2.403	0.019
Class I vs Class III	5.675	<0.001

DISCUSSION

Beta angle uses three skeletal landmarks –point A, point B, and the apparent axis of the condyle (point C). This angle reflects changes within the jaws, thus Beta angle remains stable even when the jaws are rotated. The apparent axis of the condyle (point C) was located according to Chong Yol Baik and Maria Ververidou 7 which has an advantage over condylion point that very precise tracing of the condyle is not really necessary. The clinician can visualize and approximate the center with a minimum error in Beta angle as long as that point is within 2 mm of its actual location. The results of the present study are in accordance of Chong Yol Baik and Maria Ververidou 7 who also reported that there is no statistically significant difference between mean Beta angle of males and females. The mean Beta angle for total skeletal Class I sample was 32.54 ± 0.86, skeletal Class II sample was 29.50 ± 0.74 and for skeletal Class III sample was 40.17 ± 1.44. A more acute Beta angle indicates Class II skeletal pattern, and a more obtuse Beta angle indicates Class III skeletal pattern. The results of the present study are in accordance with Chong Yol Baik and Maria Ververidou 10 for Class I and Class III Beta angle, whereas the Beta angle for Class II skeletal pattern shows a variation.

Comparison of Beta angle in the Class I and Class II shows that Beta angle in Class II is less (29.50±0.74) when compared to Class I (32.54±0.86) with P–0.019, but the difference though is insignificant, when the effective size is computed by using cohen ?d ' the value is a very large . Comparison of Beta angle in Class I and Class III sample shows statistically significant difference between Class I and Class III sample with PĐ0.001.

CONCLUSION

Following conclusions are drawn from the present study:-

There was no statistically significant difference in the Beta angle between male and female sample. The mean Beta angle for total skeletal Class I sample was 32.54±0.86, for skeletal Class II sample was 29.50±0.74 and for skeletal Class III sample was 40.17±0.66. A more acute Beta angle indicates Class II skeletal pattern, and a more obtuse Beta angle indicates Class III skeletal pattern.

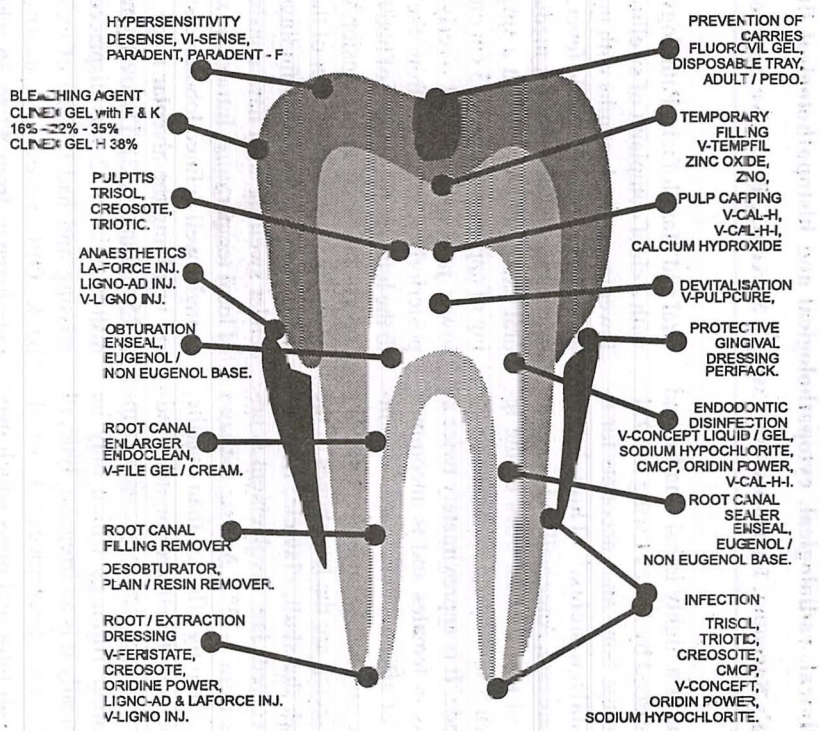
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