

## Analysis of Cephalometric Characteristics of Class II Malocclusion Patients Reporting to Department of Orthodontics

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### ABSTRACT

**Background:** The skeletal and dental anomalies that contribute to a malocclusion in a patient are very vital and the comprehensive knowledge of these components is required to design the treatment plan efficiently. Hence, the present study was planned to study the cephalometric characteristics of class II malocclusion patients reporting to department.

**Material and methods:** This study was conducted in the department of Orthodontics and Dentofacial Orthopedics of the Dental institute. For the study sample, we selected patients reporting to Outpatient department and were diagnosed with class II div 1 malocclusion. The age of the selected patients ranged from 7 to 13 years. A lateral cephalogram for each patient was done by a single operator. The distance of the subject from the X-rays source and distance at which film was kept was standardized and was kept same for all patients. For cephalograms, patients were directed to stand with natural head position, seated condyles and relaxed lips. A total of 30 patients were selected for the study of which 18 were females and 12 were males. For the tracing of cephalograms, a single operator was directed to do locate, identify and mark the points.

**Results:** From the results, it was observed SNA angle is significantly higher than normal value. On the contrary, SNB is significantly lower than normal. This states that subjects in our study have significantly more protruded maxilla and more retruded mandible.

**Conclusion:** From the results, this can be concluded that patient reporting to Department of Orthodontics of the Dental institute with Angle's class II, div 1 malocclusion have significantly increased ANB angle, decreased SNB, increased prognathism of maxilla with normal position of mandible.

**Keywords:** Angle's class II malocclusion, proclined anteriors, maxillary prognathism.

### INTRODUCTION

The skeletal and dental anomalies that contribute to a malocclusion in a patient are very vital and the comprehensive knowledge of these components is required to design the treatment plan efficiently.<sup>1, 2</sup> According to Angle, class II malocclusion is defined as class II relation of maxillary and mandibular first

molars accompanied with protrusive maxillary incisors. According to few reports, in class II division I patients, maxilla is more protrusive as compared to normal and mandible is normal with respect to size and position.<sup>3, 4</sup> On the contrary, few reports claim that in class II patients, maxilla is in normal position with respect to cranial base but the

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mandible was retrusive. Some reports found that both mandible and maxilla are retruded and protruded respectively. It can be concluded easily that this difference in findings might be due to different ethnic backgrounds of the sample population in these studies.<sup>5, 6</sup> Hence, the present study was planned to study the cephalometric characteristics of class II malocclusion patients reporting to department.

## MATERIAL AND METHODS

This study was conducted in the department of Orthodontics and Dentofacial Orthopedics of the Dental institute. Prior to starting the study, the study was approved from the ethical committee of the institute. For the study sample, we selected patients reporting to Outpatient department and were diagnosed with class II div. 1 malocclusion. The age of the selected patients ranged from 7 to 13 years. A lateral cephalogram for each patient was done by a single operator. The distance of the subject from the X-rays source and distance at which film was kept was standardized and was kept same for all patients. For cephalograms, patients were directed to stand with natural head position, seated condyles and relaxed lips. Patients having history of trauma, previous prosthodontic or orthodontic treatment, significant medical or surgical history, absence of bilateral class II molar relationship were excluded from the study. A total of 30 patients were selected for the study of which 18 were females and 12 were males. For the tracing of cephalograms, a single operator was directed to do locate, identify and mark the points. The tracing was done on matted acetate tracing paper of 0.003-inch thickness with lead pencil.

Cephalometric points used in this study:

- SNA: Maxillary apical base relationship to anterior cranial base
- SNB: Mandibular apical base relationship to anterior cranial base
- ANB: Apical base relationship
- MP-SN: Inclination of mandibular plane angle to anterior cranial base
- OP-SN: Inclination of occlusal plane to anterior cranial base
- U1-NA: Inclination of maxillary incisors to NA

- U1-NA (mm): Protrusion of maxillary incisors to NA
- L1-NB: Inclination of mandibular incisors to NB
- L1-NB: Position of maxillary incisors relative to NB
- U1-L1: Inclination of maxillary incisors to mandibular incisors

The data was entered into an excel sheet and subject to further statistical analysis.

The statistical analysis of the recorded data was done using SPSS software for windows. Student's t-test and Chi-square test were used for the analysis of the data. It was pre-determined that p-value less than 0.05 will be statistically significant.

Table 1: Mean Cephalometric measurements.

| Cephalometric measurements | Mean values in study population | Ideal values |
|----------------------------|---------------------------------|--------------|
| SNA                        | 84.21                           | 82           |
| SNB                        | 77.02                           | 80           |
| ANB                        | 6.56                            | 2            |
| MP to SN                   | 35.78                           | 32           |
| OP to SN                   | 19.25                           | 14           |
| U1-NA (mm)                 | 7.21                            | 22           |
| U1-NA                      | 26.35                           | 4            |
| L1-NB                      | 28.95                           | 25           |
| L1-NB (mm)                 | 6.98                            | 4            |
| U1-L1                      | 122.65                          | 131          |

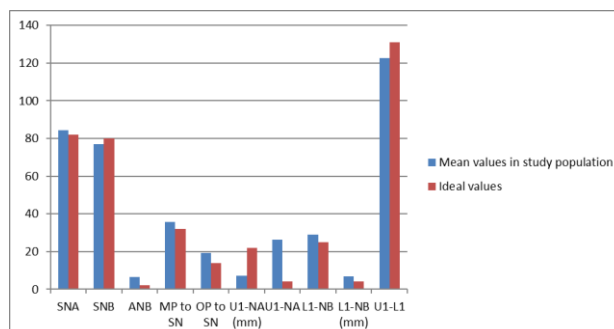


Fig 1: Mean cephalometric measurements and ideal values for respective cephalometric parameters.

## RESULTS

Table 1 shows the mean cephalometric measurements. After comparing these angular and linear measurements with mean normal values of children. From the results, it was observed SNA angle is significantly higher than normal value. On the contrary, SNB is significantly lower than normal. This states that subjects in our study have significantly more protruded maxilla and more

retruded mandible. Also, maxillary incisors are seen to be significantly proclined more than normal. On comparing the results are found to be statistically significant. ( $p < 0.05$ )

## DISCUSSION

This has been reported by previous longitudinal studies that Class II dentofacial anomalies can appear during primary dentition. Even though, this condition gets self-corrected in some individuals during growth period, however, because of the difference in growth in class I and class II malocclusion patients, this could not be self-corrected in some patients. In the present study, we studied lateral cephalograms of 30 patients with class II, div 1 malocclusion. The results were compared with previous studies and results were found to be correlating. Hassan AH et al conducted a study on dento-skeletal parameters on cephalometric X-rays done for Angle class II division I malocclusion patients in Saudi population in western region. In this study, they studied 149 lateral cephalograms. Of the 149 cephalograms, 85 were of children with Class II, div I malocclusion whereas 62 children had normal occlusion. The age of the included subjects ranged from 10-13 years. They observed that the patients with Class II, div I malocclusion had prognathic maxilla as per cranial base, however, the mandible's position was normal. Both the groups did not have any difference between the angles of cranial base. From the results, they concluded that there are some unique characters in patients with class II, div I malocclusion in western region Saudi population. For the correction of malocclusion in these patients, head gear therapy will be more beneficial than functional appliances. Ardani IGAW et al performed a study on cephalometric characteristics of skeletal class II malocclusion in Javanese Population. For the study, they selected patients with class II, div I malocclusion who reported to the department for its correction. A lateral cephalogram was taken for each patient before starting the treatment. The analysis of lateral cephalogram was done using digital cephalometric analysis. After the analysis of various cephalometric measurements, they observed that ANB, Y-axis, SN-MP, and LAFH were increased as compared to normal values. On the contrary, SNB and mandibular length were decreased. Furthermore, mandibular length and

certain other variables like facial axis, SN-MP and ANB were found to be significantly correlated. Finally, it was concluded that Javanese Population has characteristics features with respect to Class II, div I patients, that are, short mandibular length and large ANB which is necessarily due to decreased SNB and not because of increased SNA.<sup>7,8</sup>

Prasad SE et al conducted a research to differentiate the characters of class II division I and class II division II malocclusion. They studied lateral cephalograms and study models of 582 patients. The age range of the patients was from 15 to 22 years. After excluding 11 records, they studied 283 records of Class II division I malocclusion patients and 288 records of Class II division II malocclusion patients. They observed that both the groups have statistically significant difference between skeletal vertical parameters, dental parameters, and maxillary arch width parameters. Furthermore, in patients with class II division II malocclusion, significant horizontal growth pattern and decreased anterior frontal height along with retroclined upper anteriors were seen. Dodda KK et al performed a research to study characteristic features of Angle's class II div. II malocclusion. From the hospital records, they studied 612 pre-treatment records of patients. Out of 612 records, 317 were of patients with Class II, div 1 malocclusion and 295 were of patients with class II, div 2 malocclusion. The analysis of lateral cephalograms was done using Kodak software. While analysing the cephalograms, they observed that skeletal measurements and dental variables are significantly diverged from normal values. They concluded that angle's class II div 2 malocclusion patients have considerable horizontal growth pattern with decreased lower facial third.<sup>9,10</sup>

## CONCLUSION

From the results, this can be concluded that patient reporting to Departement of Orthodontics of the Dental institute with Angle's class II, div 1 malocclusion have significantly increased ANB angle, decreased SNB, increased prognathism of maxilla with normal position of mandible.

## CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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