

## Original Research

### Assessment of average Frankfort mandibular plane angle

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#### ABSTRACT:

**Background:** To assess the average frankfort mandibular plane angle. **Materials & methods:** A total of 50 lateral cephalographs were taken for study. Subjects taken to study were completely analyzed. The subjects with previous orthodontic treatment were excluded. Frankfort mandibular plane angle was calculated and evaluated. SPSS software was used for analyzing the results. **Results:** A total of 50 subjects were taken. Out of which 25 were males and 25 were females. It shows that there was a higher FMFA in males than females. The mean Frankfort mandibular plane angle for males was 26.42 and for females were 26.02. **Conclusion:** The average mandibular plane angle was significant as 25.43 degrees.

**Keywords:** occlusion, frankfort mandibular plane angle.

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#### INTRODUCTION

The FMA is an angle formed by the intersection of the Frankfort horizontal plane and the mandibular plane. This angle can be traced and measured by means of a diagnostic overlay. From clinical research, Tweed concluded that the normal variations of the FMA are 16 to 35 degrees with an average angle of 25 degrees. Variations from this mean exist among races and may exist regarding age and sex. A rule of thumb used by orthodontists is that an FMA of 25 degrees is within normal range. A "high-angle" patient is one with an FMA of 30 degrees or more, whereas a "low-angle" patient is one with an FMA of 20 degrees or less. With respect to vertical facial types, a high FMA is characterized by open-bite skeletal patterns and a low FMA by closed-bite skeletal patterns. However, the skeletal patterns should not be confused with open- and closed-bite dental patterns. <sup>(1,2)</sup> A massive amount of information about growth and development, facial and bony characteristics, and other clinical manifestations at the extremes of the FMA (vertical facial types) determined by orthodontists is now in use as an essential part of daily practice. <sup>(3)</sup> A high FMA usually shows an increase in the alveolar bone growth and a low FMA has a decrease in the bone growth. Low angle patients typically have flat, broad palatal vaults, shallow buccal vestibules, and high muscle attachments. High FMA patients are the

opposite. Stability and retention may be a problem for the low FMA person. <sup>(4)</sup> Patients with a low FMA are brachycephalic (short head) and present with a skeletal deep bite and a less convex facial profile. Overclosure of the mandible often results in an averted lower lip and deep labiomental sulcus. The upper lip appears long, limiting the display of teeth and gingiva. The curve of Spee is often accentuated due to lack of incisal contact leading to supra eruption and a deep vertical overlap of the anterior teeth. <sup>(5)</sup> Hence, present study was conducted to assess the average frankfort mandibular plane angle.

#### MATERIALS & METHODS

A total of 50 lateral cephalographs were taken for study. The head of the patient was positioned in the cephalostat and the natural head posture was obtained by making the patient look into a mirror, which was kept at eye level. The position was then stabilized with the help of ear rods, which were lightly placed in the ear. Lateral cephalographs were taken in centric occlusion with lips in relaxed position. Subjects taken to study were completely analyzed. The subjects with previous orthodontic treatment were excluded. Frankfort mandibular plane angle was calculated and evaluated. SPSS software was used for analyzing the results.

## RESULTS

A total of 50 subjects were taken. Out of which 25 were males and 25 were females. It shows that there was a higher FMPA in males than females. The mean Frankfort mandibular plane angle for males was 26.42 and for females were 26.02. The distribution of FMPA according to degrees was that majority comes under a category of 25- 29.9 degrees. 8 (32%) of the total males and 12 (48%) of the females have the FMPA between 25- 29.9.

**Table 1: mean values of frankfort mandibular angle**

Gender	Angle	Mean	Std. deviation
Male	FMPA	26.42	6.84
Female	FMPA	26.02	3.82

**Table 2: distribution of FMPA for male and female**

Degree	Male n (%)	Female n (%)
< 20	5 (20%)	4 (16%)
20-24.9	7 (28%)	6 (24%)
25-29.9	8 (32%)	12 (48%)
>30	5 (20%)	3 (12%)
Total	25 (100%)	25 (100%)

## DISCUSSION

The relationship between the malocclusion and the facial form has been a focus for Orthodontists since the early 20th century. Cephalometrics can be utilized to describe, compare and classify the nature of orthodontic problems. Since well-established Indian ethnic norms are lacking, norms derived for Caucasian population are routinely used for investigations. <sup>(6)</sup> In our present study, total of 50 subjects were taken. Out of which 25 were males and 25 were females. It shows that there was a higher FMPA in males than females. The mean Frankfort mandibular plane angle for males was 26.42 and for females were 26.02.

A comprehensive and accurate diagnostic assessment of any orthodontic patient involves the comparison of the patient's cephalometric findings with the norms of his or her ethnic groups or racial groups or subgroups. A study conducted on 100 lateral cephalographs which were selected from the records in the Department of Orthodontics and Dentofacial Orthopedics. According to results there was a higher FMPA in males than females. While observing the overall result no significant difference was observed in FMPA between male and female population. One of the study was undertaken to develop cephalometric norms of Tweed's diagnostic facial triangle. The result of the study indicated that separate norms should be considered for males and females during diagnosis and treatment planning. <sup>(7,8)</sup> In our study, the distribution of FMPA according to degrees was that majority comes under a category of 25- 29.9 degrees. 8 (32%) of the total males and 12 (48%) of the females have the FMPA between 25- 29.9.

The objective of the another study conducted was to determine the level of evidence relative to the usefulness of the Frankfort mandibular plane angle in prosthodontic treatment. The Patient Intervention Comparison Outcome (PICO) mesh heading received zero PubMed references, as did Frankfort Mandibular Plane Angle (FMA) as a determinant for dental occlusion and Frankfort Mandibular Plane Angle as a determinant of the occlusal scheme. Four others, three prosthodontic and one orthodontic publication, were related to the PICO. A search revealed one additional article, which was a narrative review. Nine articles were related to the search, 2 of which were clinical trials that revealed no evidence to support the use of FMA as a diagnostic test. Based on the limited data presented above, there is a lack of evidence to support the use of FMA as a diagnostic procedure to predict outcomes, or dictate prosthodontic treatment. <sup>(9,10)</sup>

Cephalometric information, specifically, vertical facial types and the Frankfort-mandibular plane angle, pertinent to prosthodontics has been discussed. The Frankfort-mandibular plane angle (FMA) is formed by the intersection of the Frankfort horizontal plane and the mandibular plane. This angle can be traced and measured by means of a diagnostic overlay. An FMA of 25 +/- 5 degrees is within normal range. A high-angle patient has an FMA of 30 degrees or more, and a low-angle patient has an FMA of 20 degrees or less. A high FMA is characterized by open-bite skeletal patterns, and a low FMA by closed-bite skeletal patterns. <sup>(11)</sup>

## CONCLUSION

The average mandibular plane angle was significant as 25.43 degrees.

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