



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3518869>Available online at: <http://www.iajps.com>

Research Article

**ANALYSIS OF COMPARISON OF INCISORS INCLINATION IN
HYPERDIVERGENT AND HYPODIVERGENT PATIENTS**Dr Moiz Ahmed¹, Dr Hamza Ahmad¹, Dr Jamal Ahmed¹¹Demontmorency College of Dentistry, Lahore.

Article Received: August 2019

Accepted: September 2019

Published: October 2019

Abstract:

Introduction: For proper diagnosis and treatment planning in orthodontics, thorough knowledge of both skeletal and dental components in all 3 dimensions: sagittal, vertical and transverse, is essential.

Aims and objectives: The main objective of the study is to analyse the incisors inclination in hyperdivergent and hypodivergent patients.

Material and methods: This cross sectional study was conducted in Demontmorency College of Dentistry, Lahore during December 2018 to July 2019. Sampling technique was non-probability, purposive. Sample was divided into 2 groups: hyperdivergent and hypodivergent patients. Facial divergence was determined by mandibular plane angle (SN-MP) used in Steiner's analysis. 20 Age range of the sample was 16 years to 31 years.

Results: The distribution of the patients into groups is provided. The normodivergent group consisted of 46 subjects (24 females, 22 males) with a mean age of 30.2 ± 6.3 years; the hypodivergent group consisted of 49 subjects (26 females, 23 males) with a mean age of 30.3 ± 7.6 years; and the hyperdivergent group consisted of 40 subjects (24 females, 16 males) with a mean age of 29.5 ± 5.3 years.

Conclusion: It is concluded that there was no statistically significant difference in the molar inclinations of hyperdivergent, normodivergent, and hypodivergent adult subjects with Class I sagittal relationships.

Corresponding author:**Dr. Moiz Ahmed,**

Demontmorency College of Dentistry, Lahore.

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Please cite this article in press Moiz Ahmed et al., *Analysis Of Comparison Of Incisors Inclination In Hyperdivergent And Hypodivergent Patients*, Indo Am. J. P. Sci, 2019; 06(10).

INTRODUCTION:

For proper diagnosis and treatment planning in orthodontics, thorough knowledge of both skeletal and dental components in all 3 dimensions: sagittal, vertical and transverse, is essential. Among several parameters that are considered during orthodontic treatment planning, maxillary incisor inclination is of prime importance due to its profound effect on smile esthetics. Maxillary and mandibular incisors position and inclination influence the upper and lower lip positions [1].

Despite the widespread influence of US orthodontics, with its standards and references, it is known that these do not apply to the ethnically mixed Brazilian population. Facial profiles have often been compromised due to little or no importance given to the analysis of soft tissues [2]. In contemporary orthodontics, attention to the soft tissues of the face has prevailed over all other types of complementary exams. With the advent of facial pattern classification into Classes I, II and III based on the facial characteristics of each patient, diagnostic data have become more meaningful when added to the numerous analyses that serve as input for the understanding of dental and facial components and their relationship with malocclusions [3].

With this in mind, it is understandable that knowledge of facial growth pattern provided by certain cephalometric analyses can also be very useful in establishing diagnosis, treatment plan and prognosis based on the outcomes of orthodontic treatment. Insight into how the variables of the craniofacial complex can contribute to the development of malocclusion, and that there are various manners in which parts of the skull and face (taken as normal in isolation) can form, in conjunction, an undesirable combination, can evidence the role and integration of each variable in facial morphology [4].

Studies that have investigated inclinations of posterior teeth have often grouped subjects according to sagittal

or vertical skeletal characteristics. Shu et al. compared groups assigned according to sagittal characteristics and found that Class II division 1 subjects showed more lingually inclined maxillary molars, compared with individuals with Class I occlusion. In contrast, they could not find any difference for mandibular molars [5].

Aims and objectives:

The main objective of the study is to analyse the incisors inclination in hyperdivergent and hypodivergent patients.

MATERIAL AND METHODS:

This cross sectional study was conducted in Demontmorency College of Dentistry, Lahore during December 2018 to July 2019. Sampling technique was non-probability, purposive. Sample was divided into 2 groups: hyperdivergent and hypodivergent patients. Facial divergence was determined by mandibular plane angle (SN-MP) used in Steiner's analysis. Age range of the sample was 16 years to 31 years. Each lateral cephalogram was traced on 8 x 10 inch standard translucent acetate tracing paper, over a standard illuminated view box with a fine-point lead pencil.

Statistical analysis:

All the data was recorded on the Proforma. SPSS version 21 was used to analyze the data. Frequency and percentage were calculated for qualitative variable i.e. gender.

RESULTS:

The distribution of the patients into groups is provided. The normodivergent group consisted of 46 subjects (24 females, 22 males) with a mean age of 30.2 ± 6.3 years; the hypodivergent group consisted of 49 subjects (26 females, 23 males) with a mean age of 30.3 ± 7.6 years; and the hyperdivergent group consisted of 40 subjects (24 females, 16 males) with a mean age of 29.5 ± 5.3 years.

Table 1: Numbers of females and males in each group, along with their average ages

| Vertical facial type | Gender | | Age (yr) |
|----------------------|-----------|-----------|------------|
| | Female | Male | |
| Normodivergent | 24 (52.2) | 22 (47.8) | 30.2 ± 6.3 |
| Hypodivergent | 26 (53.1) | 23 (46.9) | 30.3 ± 7.6 |
| Hyperdivergent | 24 (60.0) | 16 (40.0) | 29.5 ± 5.3 |

Values are presented as number (%) or mean ± standard deviation.

The images were reoriented in three planes of space. The anatomical occlusal plane was aligned parallel to the floor in the sagittal view. In the coronal and axial views, CBCT images were adjusted using a line passing through the buccal cusps of the maxillary first molars.

Table 02: Comparison of buccolingual molar inclination between females and males

| Buccolingual inclination | Female | Male | p-value |
|--------------------------|-------------|-------------|---------|
| Normodivergent | 24 | 22 | |
| U6 | 81.3 ± 5.5 | 82.4 ± 4.4 | 0.316 |
| U7 | 75.9 ± 6.4 | 77.2 ± 4.7 | 0.269 |
| L6 | 107 ± 6.9 | 104.2 ± 6.4 | 0.053 |
| L7 | 110.5 ± 7.0 | 107.1 ± 5.9 | 0.051 |
| Hypodivergent | 26 | 23 | |
| U6 | 82.4 ± 4.3 | 81.2 ± 5.0 | 0.183 |
| U7 | 77.3 ± 5.2 | 75.0 ± 4.5 | 0.091 |
| L6 | 104.2 ± 5.2 | 103.7 ± 7.0 | 0.697 |
| L7 | 108.2 ± 6.1 | 106.1 ± 6.9 | 0.108 |
| Hyperdivergent | 24 | 16 | |
| U6 | 84.2 ± 5.3 | 82.3 ± 5.4 | 0.110 |
| U7 | 75.3 ± 6.5 | 75.4 ± 6.9 | 0.944 |
| L6 | 104.4 ± 5.3 | 104.3 ± 5.9 | 0.953 |
| L7 | 108 ± 6.2 | 110.7 ± 6.6 | 0.098 |

DISCUSSION:

Berlanga et al carried a study in Spain to determine lower incisor dentoalveolar compensation and symphysis dimensions between a Class I and a Class III sample group with different vertical patterns [6]. They found no statistically significant difference in mandibular incisor inclination in class I patients with long face and short face. Their results differ from findings of present study, as statistically significant differences were found in mandibular incisor inclination in hyperdivergent and hypodivergent patients with skeletal class I in the present study. Racial differences in dentofacial and soft tissue morphology, as proved by multiple studies, might be the reason for dissimilarity of the results [7]. Gutermann et al conducted a study to evaluate possible

associations of lower incisor inclination with gender, age, symphyseal parameters, and skeletal pattern. They found a negative correlation between lower incisor inclination and facial divergence [8]. They concluded that lower incisors are more retroclined in hyperdivergent subjects. These results are in contrast to our findings: lower incisors were found more proclined in hyperdivergent patients in the present study [9]. The dissimilarity of results could be because they have chosen growing patients (8 to 16 years of age) for their study, in contrast to this, only adult patients (16 to 30 years of age) with CVM stage 5 or 6 were included in the present study because most substantial craniofacial growth has been achieved by that time and effect of vertical growth on incisor inclination is fully expressed. Perioral muscular force

also increases with age, lower in children as compared to the adults [10].

CONCLUSION:

It is concluded that there was no statistically significant difference in the molar inclinations of hyperdivergent, normodivergent, and hypodivergent adult subjects with Class I sagittal relationships.

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