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Perception to altered antero-posterior maxillary incisor position in mild skeletal Class III patients with maxillary deficiency in two different ethnic groups

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Abstract:

Aim and Objectives:

The aim of this study is to determine the perception of smile esthetics among orthodontists, general dentists, and laypersons, with respect to altered antero-posterior maxillary incisor position, in mild skeletal Class III patients with maxillary deficiency by assessing oblique smile photographs among Mongoloids and Dravidians.

Materials and Methods:

The study groups consisted of thirty evaluators comprising of fifteen males and fifteen females each from groups of Orthodontists, General Dentists and Laypersons. They evaluated the photographs of four participants, comprising of one male and one female each from the Dravidian and Mongoloid population. The cephalometric evaluation comprised of five angular measurements and four linear measurements. These measurements determined the severity of Class III malocclusion and the associated mid – face deficiency. The digitized photographs were edited to alter the maxillary incisor position by proclining them by +1mm and +2mm increment, and vice – versa and given to each study group for rating them on a Visual Analogue Scale (VAS).

Results: Statistical results showed no statistically significant differences in the gender distribution between 3 groups Both the professional groups i.e., Orthodontists and General Dentists preferred no changes in the maxillary incisor area for both Mongoloid and Dravidian Female population whereas the laypersons preferred proclined maxillary incisor position for Dravidian females and retroclined maxillary incisors for Mongoloid females. Overall, all the alterations in the Mongoloid male population were given a higher rating than Dravidian population, among which proclined maxillary incisor position was rated most esthetic for Mongoloid Males. Both the professional groups i.e., Orthodontists and General Dentists preferred no changes in the maxillary incisor area for both Mongoloid and Dravidian Female population whereas the laypersons preferred proclined maxillary incisor position for Dravidian females and retroclined maxillary incisors for Mongoloid females. In the case of males, general dentists preferred mild proclination by 1mm in the maxillary incisor position for both the population groups

Conclusion: Hence, the study indicates that there lies varying effect of altered antero- posterior position of the maxillary incisors on smile esthetics in mild-skeletal Class III patients with maxillary deficiency among Orthodontists, General Dentists and Laypersons within Mongoloid and Dravidian populations of both the genders.

Keywords: Oblique Smiling Photograph, Altered Maxillary Incisor Position, Dravidian and Mongoloid Ethnic Groups, Mild Skeletal Class III malocclusion, Mid – face deficiency, Visual Analogue Scale

INTRODUCTION

The rising demand for orthodontic treatment is driven by an increasing focus on facial aesthetics, which is vital for social acceptance. Over 70% of parents believe that orthodontic treatment can enhance their children's attractiveness, social acceptance, and success. Profile aesthetics and smile attractiveness are key motivations for orthodontic care, as a smile strongly impacts facial aesthetics in social interactions.¹⁻⁵ While much research on smile aesthetics exists, most studies focus on frontal view photographs, which may not capture the three-dimensional nature of a smile. Therefore, lateral and oblique view images are also necessary in orthodontic diagnosis and treatment planning. These views reveal occlusal cant, skeletal patterns, and dental compensations, particularly important in patients with skeletal Class III malocclusion, to achieve favorable facial aesthetics. The understanding of facial aesthetics has shifted from subjective preferences to quantitative soft tissue evaluations. Orthodontists have pioneered norms and data for soft-tissue analysis, valuable in various dental and surgical fields. Today, orthodontic diagnosis and treatment planning emphasize soft tissue, moving beyond Angle's occlusal paradigm. Class III malocclusion, especially with a retrusive maxilla or prognathic mandible, significantly impacts facial aesthetics. The natural compensation involves proclined upper and retroclined lower anteriors.⁶⁻¹⁰ Treatment, whether through compensatory orthodontics or orthognathic surgery, often prioritizes facial attractiveness. In borderline skeletal Class III cases, facial profile improvement is a major treatment goal. Camouflage treatment for Class III malocclusion may include maxillary incisor proclination, mandibular incisor retrusion, and mandibular rotation. However, ideal occlusion does not always align with aesthetic outcomes. Strict adherence to cephalometric standards may not meet aesthetic criteria, necessitating a thorough assessment of the interaction between soft and hard tissues. Esthetic treatment should prioritize the maxillary central incisors, as their position significantly influences the smiling profile. Overjet, the horizontal discrepancy of anterior teeth, plays a critical role in smile characteristics across different malocclusions. Ethnic and racial differences, along with factors such as sex, age, education, socioeconomic status, and geography, shape aesthetic preferences. Smile aesthetics are subjective, influenced by personal experiences and social environment.¹¹⁻¹⁵ Therefore, orthodontic treatment must align with the patient's aesthetic perceptions. While orthodontists are trained to value good occlusion and straight profiles, understanding and respecting the patient's aesthetic concept is crucial.

AIM AND OBJECTIVES OF THE STUDY:

The aim of this study is to determine the perception of smile esthetics among orthodontists, general dentists, and laypersons, with respect to altered antero-posterior maxillary incisor position, in mild skeletal Class III patients with maxillary deficiency by assessing oblique smile photographs among Mongoloids and Dravidians. Okay I sorry hi what's going on hi

METHODOLOGY

This photogrammetric study was designed to determine the perception of smile esthetics among orthodontists, general dentists and laypersons, with respect to altered labiolingual angulation and anteroposterior position of the maxillary central incisors in a mild Class III patient using oblique smile analysis and to establish a set guideline for the maxillary labiolingual inclination and anteroposterior positioning of maxillary incisor in Class III patients. Patients seeking orthodontic treatment at the Department of Orthodontics and Dentofacial Orthopaedics, Bangalore Institute of Dental Sciences and Hospital, Bangalore, were screened for the inclusion criteria. Four participants, comprising of one male and one female each will be selected from the Dravidian and Mongoloid population, meeting all the inclusion criteria. The details of the study were explained, and an informed consent was taken from the patients before conducting the study. For cephalometric evaluation, pretreatment lateral cephalograms of the patients were traced on appropriate landmarks. Pre – treatment right oblique smiling photographs were taken as shown in Figure 1. Alteration of the position of maxillary incisors of the participants was done antero-posteriorly, to assess the facial attractiveness with the help of a Visual Analogue Scale (VAS).

Fig. 1: Photographic Setup - Demonstration



RESULTS

The 5 altered images of the patient were displayed on a single slide, for each patient on Microsoft PowerPoint software, totaling to 4 slides..Descriptive statistics like mean and standard deviation for quantitative variables, frequency and proportions for categorical variables was calculated. Inferential statistics like measures Chi Square Test followed by Mann Whitney Test was used to compare the mean gender distribution between 3 groups and the mean Visual Analogue Scale (VAS) scores for different photographs between Dravidian and Mongoloid females and males. Kruskal Wallis Test followed by Dunn's post hoc test was used to compare the mean VAS scores for different photographs between 3 groups for Dravidian and Mongoloid females and males. The results of the study were tabulated and analysed.The level of significance was set at **P<0.05**.

Table 1 depict the **Comparison of mean gender distribution between 3 groups using Chi Square Test**

There was no discernible variation in the gender distribution across the three groups, with males and females making up 50% of each group.

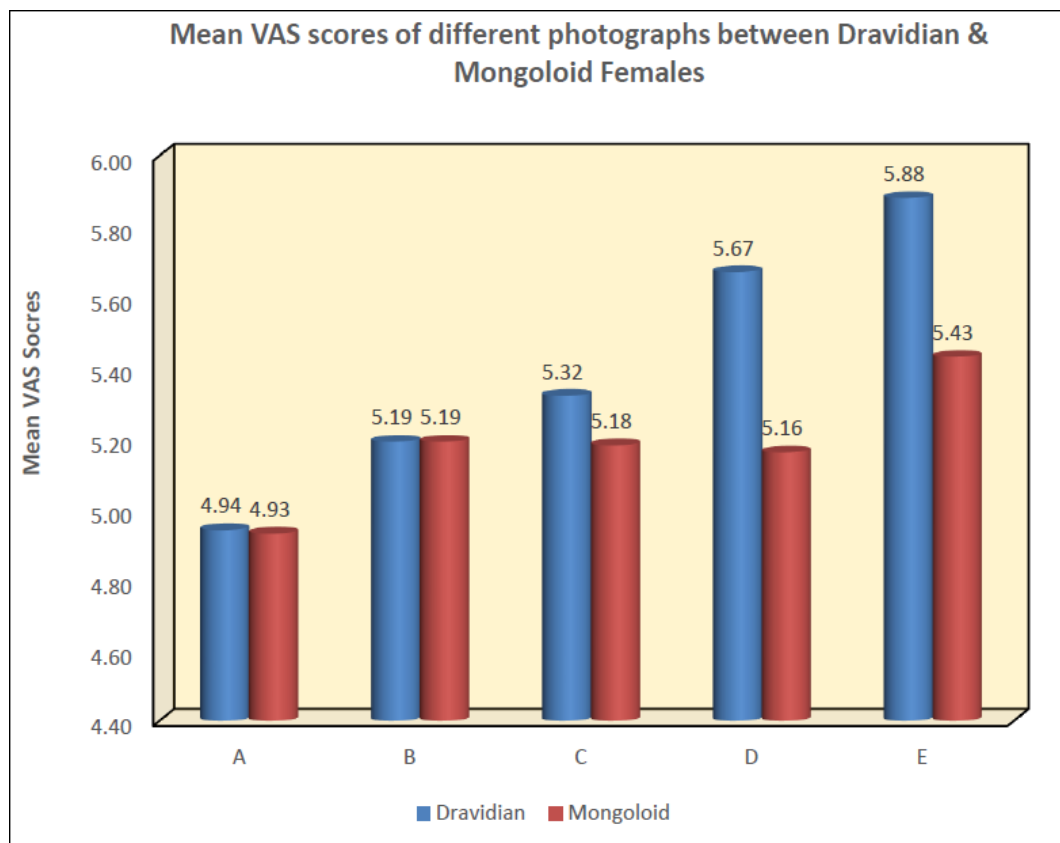
Table 1: Comparison of gender distribution between 3 groups using Chi Square Test								
Variable	Category	Group 1		Group 2		Group 3		p-value
		n	%	n	%	n	%	
Gender	Males	15	50.0%	15	50.0%	15	50.0%	1.00
	Females	15	50.0%	15	50.0%	15	50.0%	

Note: Group 1: Orthodontists, Group 2: General Dentists & Group 3: Lay Persons

Graph 1 depict the **Comparison of Mean VAS scores of different photographs between Dravidian & Mongoloid Females**

Female Dravidian which was the first participant in our study depicted as Case 1 had mean VAS scores for Photograph D with altered maxillary incisor position at +2mm that were significantly higher [5.67 ± 1.77] than Mongoloid females depicted as Case 2

[5.16 $\pm$ 2.03], with the mean difference being statistically significant at $p=0.04$. Female Dravidians had somewhat higher mean VAS Scores for Photographs A with +1mm alteration, C with -1mm alteration, and E unchanged at 0mm than female Mongoloids. The mean differences, however, did not statistically differ from one another. Females of Dravidian and Mongoloid descent had comparable mean VAS scores for Photograph B at -2mm alteration, and there was no statistically significant difference between them.

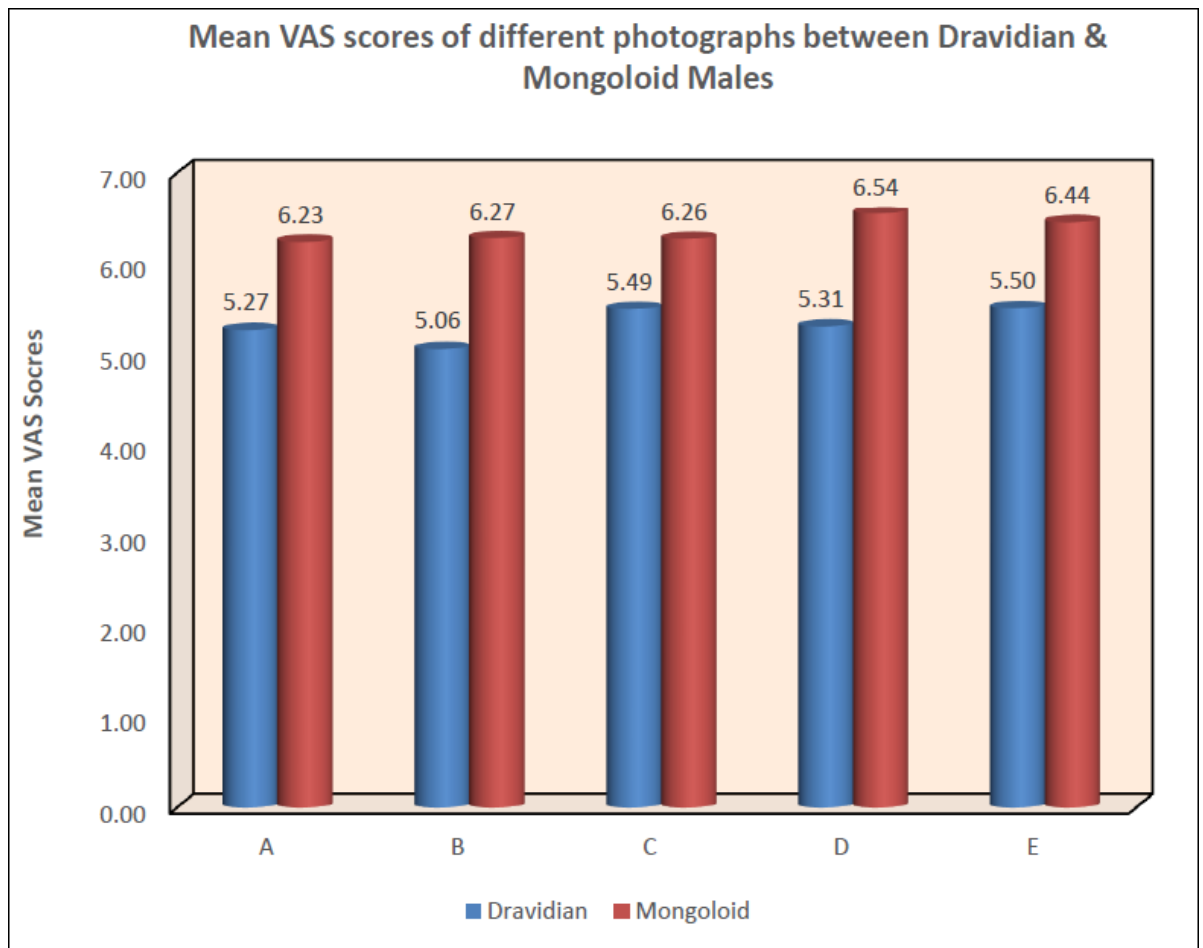


Graph 1: Comparison of mean VAS scores of different photographs between Dravidian & Mongoloid Females using Mann Whitney Test

Graph 2 depict the Comparison of mean VAS scores of different photographs between Dravidian & Mongoloid Males

Mongoloid male depicted as Case 4 had significantly higher mean VAS scores for Photographs A at +1mm alteration (6.23 ± 1.58), B at -2mm (6.27 ± 1.40), C at -1mm (6.26 ± 1.60), D at +2mm (6.54 ± 1.63), and E at 0mm (6.44 ± 1.62) than Dravidian males depicted as Case 3, with mean differences that were statistically significant at $p < 0.001$, $p < 0.001$, $p = 0.002$, $p < 0.001$ & $p = 0.004$, respectively. This implies that all the images of Mongoloid males had higher mean VAS scores than those of Dravidian men.

Hello



Graph 2: Comparison of mean VAS scores of different photographs between Dravidian & Mongoloid Males using Mann Whitney Test

DISCUSSION

The results showed Differences were present in the esthetic preferences of general public and professionals. There is varying preferences in esthetic pleasantness in Dravidian and Mongoloid population among laypersons, general dentists and orthodontists. Overall, all the alterations in the Mongoloid male population were given a higher rating than Dravidian population, among which a proclined maxillary incisor position was rated most esthetic for Mongoloid Males. Both the professional groups i.e., Orthodontists and General Dentists preferred no changes in the maxillary incisor area for both Mongoloid and Dravidian Female population whereas the laypersons preferred proclined maxillary incisor position for Dravidian females and retroclined maxillary incisors for Mongoloid females. In the case of males, general dentists preferred mild proclination by 1mm in the maxillary incisor position for both the population groups. Laypersons and Orthodontists preferred no changes in the maxillary incisor for Dravidian males as the most esthetic and proclined maxillary incisors as the most esthetic for Mongoloid males. General Dentists on the other hand preferred only slight proclined maxillary incisors by 1mm for males from both the groups. Okay This study focused on the inclination of maxillary incisors is a key aspect of the profile view. However,

literature reveals inconsistencies regarding the most aesthetically pleasing inclination. Cao et al.,³ supported this view, noting that proclined incisors might be more visually appealing. Conversely, some researchers argue that natural upright positioning is preferable, with retroclination potentially signaling aging due to loss of torque. Analyzing smiling profiles in three dimensions rather than two-dimensional photographs offers a more accurate representation of how smiles are perceived. Therefore, lateral and oblique view pictures are recommended for orthodontic diagnosis and treatment planning. Evaluations of facial aesthetics often involve different panels, with the perception of beauty varying based on factors like regional background, education, and gender. Research by Peerlings et al. Hello highlights the influence of panel composition on aesthetic judgments, noting that orthodontists are typically more critical than laypersons. The study used Visual Analogue Scales to rate the photographs, aligning with the trend of using such scales in dental and facial aesthetics evaluations. Previous studies, including those by Albwardi et al.¹² and Fabre et al., suggest that maintaining a proclined position for maxillary incisors is often preferable for mild Skeletal Class III cases.

CONCLUSION

This study was designed to determine the perception of smile esthetics among orthodontists, general dentists and laypersons, with respect to altered antero-posterior maxillary incisor position, in mild skeletal Class III patients with maxillary deficiency by assessing oblique smile photographs among Mongoloids and Dravidians.

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