

Comparative evaluation of occlusal plane (ala-tragus line) in dentulous patient among South Indian and Malaysian population

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ABSTRACT

Background: A line from the lower border of the ala of the nose to the upper border of the tragus of the ear is called Ala-Tragus line. It is one of the most commonly used occlusal reference plane for complete denture construction. Ala-Tragus line consists of three different levels such as superior, middle, and inferior. **Aim:** The aim of the study was to evaluate the occlusal plane (OP) (Ala Tragus line) in Dentulous patient among South Indian population and Malaysian population. **Materials and Methods:** A total of 40 participants, in which 20 South Indian and the other 20 Malaysian were participated in this study. The subjects were asked to sit in upright position and three lines were drawn from the inferior border of the ala of the nose to the three different level (Superior, Middle, and Inferior) of the tragus of the ear on both sides using dental plaster and finally check for the parallelism using fox plane. **Results:** The majority (87%) of the population shows OP was found to be parallel to the inferior level of the tragus, and there is no parallelism between the OP and the superior level of the tragus among both the population and there is no significant difference in OP relationship between South Indian and Malaysian population. **Conclusion:** There is no significant difference in OP relationship between South Indian and Malaysian population. And the inferior border of the ala tragal line is suggested as the best posterior reference point in younger age individuals.

KEY WORDS: Ala tragus line, Complete denture, Malaysian, Occlusal plane, Posterior reference point, South Indian

INTRODUCTION

Occlusal plane (OP) is defined as the average plane established by the incisal and occlusal surfaces of the teeth (GPT).^[1] The orientation of OP is one of the most indispensable clinical procedures in prosthodontic rehabilitation for edentulous subjects. The position of the OP orientation not only forms the basis for ideal tooth arrangement but also should fulfill the necessary mechanical, esthetic, and phonetic requirements, and aid in respiration and deglutition.^[2] Although the orientation of OP is under the control of the clinician, the faulty orientation of the OP will affect the interaction between tongue and buccinator muscle. If the occlusal table is too high, it will cause food

collection in the sulci. If it is too low, it will result in biting of the cheek or tongue.^[3-4]

The faulty orientation of the OP will affect the interaction between tongue and buccinator muscle. If the occlusal table is too high, it will cause food collection in the sulci. If it is too low, it will result in biting of the cheek or tongue.^[4] Not only this but it can also lead to instability of dentures, tissues alteration, and bone resorption. Correct orientation of OP plays a key role in optimal functional and esthetic achievement.^[5] A common approach for the orientation of OP is that it is oriented anteriorly to fulfill esthetic and phonetic requirements and posteriorly parallel to ala-tragus line.^[6]

According to Boucher,^[7] "It seems to be obvious that if the soft tissue surrounding the denture is to work around as they did around natural teeth, OP should be oriented exactly as it was when the natural teeth were present."

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Various landmarks and techniques had been used over the years by clinicians and researchers for establishing this plane, which include: Orientating the OP with the buccinator grooves and the commissure of the lip. Terminating the OP posteriorly at the middle or upper third of the retromolar pad, positioning the OP on the same level as the lateral border of the tongue and many more concepts have been reported in literature.^[8]

To aid in the rehabilitation of OP numerous reference planes and landmarks have been suggested. Of these, campers planes is the most commonly used reference plane.^[9]

According to a study done by Levin and Sauer,^[10] ala-tragus line is the most widely used and frequently taught as a method for determining the OP.

The use of the ala-tragus line to orient the OP is advocated by some authors. However, there is some controversy on the exact points of references of the ala-tragus line.^[11]

The glossary of prosthodontics terms^[1] states that the ala-tragus line runs from the inferior border of the ala of the nose to some defined point on the tragus of the ear, usually considered to the tip of the tragus. It does not specify which part of the tragus should be used as the posterior landmark.

Relationship exists in between age groups and level of ala-tragus line. In young adult age group, OP was found to be more parallel to ala-tragus line when the inferior border of tragus was considered as a posterior reference point and hence should be used as a posterior reference point in establishing OP in completely edentulous patients in young age group. In middle age and old age group, both middle and superior border of tragus can be taken as posterior reference point while orienting the OP for these age groups.^[12]

Some dentists position the OP parallel to and midway between the residual ridges.^[13]

Still other dentists recommend placing the OP so that it terminates posteriorly at the medial 2/3rd of the retromolar pad.^[14]

Thus, the differences of opinion exist today regarding the most appropriate location of the OP and its relation to the Camper's plane. Thus, the aim of the study is to compare the OP (Ala-tragal line) relationship in dentulous patient among South Indian and Malaysian population.

MATERIALS AND METHODS

This study was conducted among South Indian and Malaysian population of Saveetha dental college, with complete natural dentition and Angel's Class I occlusal relationship were selected. Sample size

calculation: The confidence level was set at 95%, with confidence interval as 14. Since the total population of South Indian and Malaysian population was 40, the sample size needed was 39.

Inclusion criteria followed were:

1. Dentulous patient
2. Angle's Class 1 molar relation
3. Normal overjet
4. Normal overbite
5. No missing tooth.

Exclusion criteria followed were:

1. Previous history of orthodontic or orthognathic treatment
2. No posterior teeth present to aid in determining OP
3. History of facial or temporomandibular joint surgeries
4. Poor systemic health
5. Presence of bone or skin diseases
6. Congenitally missing teeth or extracted teeth
7. Supraeruption or drifting of teeth
8. Presence of advanced periodontal diseases.

Following case selection, the subjects were asked to sit in upright position and three lines were drawn from the inferior border of the ala of the nose to the three different level (Superior, Middle, and Inferior) of the tragus of the ear on both sides using dental plaster and Fox plane was placed intraorally so that it touched incisal edges of upper incisors and cusps of left and right upper first molars and the subjects were asked to hold fox plane, Finally, check for the parallelism and the data were entered into a computer. Descriptive analysis was undertaken, to present an overview of the findings from this population. Differences between groups were evaluated using cross-tabulations.

RESULTS

A total of 40 participant were participated in this study in which from the total, 20 are South Indian population, and another 20 were Malaysian population.

According to the results of the present study, [Figure 3] South Indian group shows there is no parallelism between the OP and the superior level of the tragus. 10% of the South Indian population shows that the OP was found to be parallel to the Middle level of the tragus. And majority (90%) of the South Indian population shows that the OP was found to be parallel to the inferior level of the tragus.

[Figure 4] Malaysian group also shows there is no parallelism between the OP and superior level of the tragus. 15% of the Malaysian population shows that the OP was found to be parallel to the middle level of the tragus. And majority (85%) of the Malaysian population shows that the OP was found to be parallel to the inferior level of the tragus.

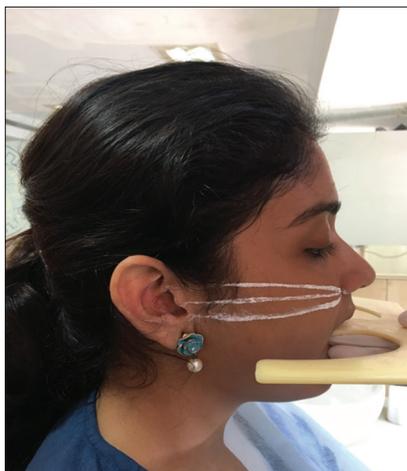


Figure 1: Occlusal Plane evaluation in south indian female (population)



Figure 2: Occlusal Plane evaluation in Malaysian female (population)

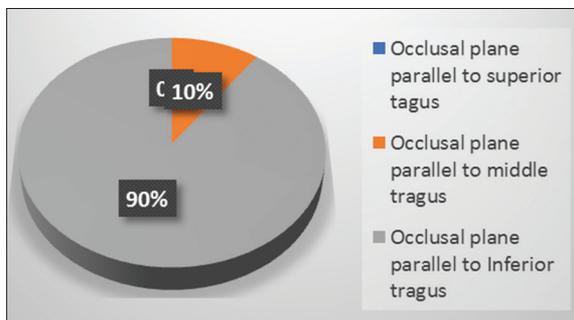


Figure 3: South Indian Population

Figure 5 shows there is no significant difference in OP relationship between South Indian and Malaysian population.

DISCUSSION

Using ala-tragus line for establishing OP is a common method in the fabrication of complete dentures. However, there is some controversy on the posterior

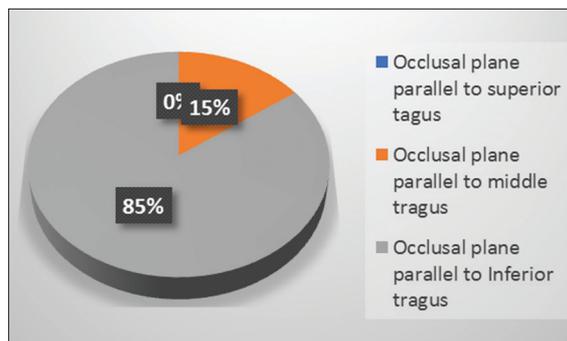


Figure 4: Malaysian Population

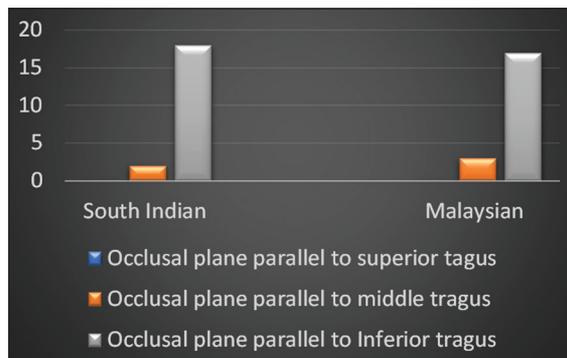


Figure 5: South Indian and Malaysian population

end of the ala-tragus line. Given these factors, it was decided to determine which one is parallel to the OP and could be use for orientation the OP: The superior border of ala-tragus, the central point of ala-tragus or the inferior border of ala-tragus.^[15]

To analyze level of ala-tragus line, various instruments have been devised and used. Bite plane leveler, J plane, Campers plane indicator, and more recently, OP analyzer, and OP oriented have been used to locate ala-tragus line.^[16] Fox plane is the simplest and most widely used instrument to aid in determining OP.^[5] It is also less bulk than other instruments. Furthermore, it is the most commonly used instrument for establishing OP in edentulous patients. Therefore, fox plane was used for the present study.

Till now no literature does not compare OP relationship among two populations. Hence, this study compares the OP relationship between South Indian and Malaysian population.

According to the result of the present study, it shows that there is no parallelism between the OP and the superior level of the tragus among both the population and there is no significant difference in OP relationship between South Indian and Malaysian population.

Similar to the present study there are several other studies which have shown that line joining ala of nose to lower border of tragus is nearer to OP^[17] in Class I

subjects (Angle's Class I molar relation), but in the present study some subjects have shown ala-middle border of tragus is nearer to OP in Class I subjects. This may be due to the length of the tragus. In the subjects with short tragus, there was not much distance between lower and middle border of the tragus thus making both the lower and middle borders almost parallel to OP. In this study, it was found that in none of the subjects upper border of the tragus is parallel to the OP. This might be due to the anteroposterior dimensions of the maxillary base, which governs angulation of the OP. The greater the distance between anterior nasal spine and the hamular notch, (i.e., wider anterior cranial base) more acute will be the angulation of the occlusal plane and conversely smaller the distance between anterior nasal spine and the hamular notch more obtuse will be the angulation of occlusal plane.^[18]

Some studies show, there is no parallelism between the OP and the ala-tragus line with three different posterior ends. The average angle between the OP and the ala-superior border of tragus was 1.80° (3.12); the average angle between the OP and the middle of ala-tragus was 4.16° (3.89); and the average angle between the OP and the inferior border of ala-tragus was 5.83° (4.77). The superior border of the ala-tragus line had the lowest mean angle (1.80°) (3.12) and is almost parallel to the OP.^[15]

Karkazis and Polyzois^[19] showed in cephalometric study that natural and artificial OPs are not parallel to the ala-tragus line. The average angles for natural and artificial teeth were 2.84° (3.45) and 3.25° (4.69), respectively. Another study concludes that the inferior border of ala-tragus line as the posterior reference point in younger age individuals.^[20]

CONCLUSION

Within the limitations of this study, it can be concluded that the majority of the population shows that the OP was found to be parallel to the inferior level of the tragus. And there is no significant difference in OP relationship between South Indian and Malaysian population.

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