# A COMPARATIVE ASSESSMENT OF LIP PRINTS AND ANGLE'S MOLAR RELATIONS

**Dental Science**

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## ABSTRACT

**Aim:** To assess the correlation or explore the possible association between different cheiloscopic patterns with permanent molar relationships.
**Materials and methods:** 30 randomly selected children aged 14-16 years having all permanent second molars fullyerupted were clinically examined to determine the molar relationships. Lip prints of these subjects were recorded with lipstick-cellophane tape method and analyzed for the lip print patterns as per the classification of Tsuchihashi et al. Results obtained were statistically analyzed using SPSS software version 24.
**Results:** On comparing lip print patterns with malocclusion, patients with Class II malocclusion showed an increased Type I' (incomplete vertical) lip print pattern, which was statistically significant (p value = 0.012). There was no statistically significant correlation between other classes of malocclusion and lip prints.
**Conclusion:** Lip prints, similar to dermatoglyphics can be used as a predictor of malocclusions in permanent dentitions. Future studies with larger sample size may be required to provide a deeper insight and more significant correlations between lip prints and permanent molar relations.

## KEYWORDS

Lip prints, cheiloscopic patterns, malocclusion, Angle's classification, cheiloscopy.

## INTRODUCTION

Identification of humans is prerequisite for personal, social and legal reason. The invention of finger print in the past century is the only reliable means of human identification. Finger prints are exclusive and atypical for every individual. The study of finger prints is called Dermatoglyphics. It is used for personal recognition, scandalous investigation and study of genetic diseases since many decades.

Similarly lip prints are also gaining importance in forensic odontology. Lip prints are unique to an individual, just like finger prints. The wrinkles and grooves on the labial mucosa (called sulci labiorum) form a characteristic pattern called lip prints, the study of which is referred to as Cheiloscopy.[1] Lip prints were first studied by anthropologist Fischer in 1904. Lip prints also known as cheiloscopic patterns, too can be used for personal recognition, criminal investigations and study of genetically determined diseases. [2]

Malocclusion, as determined by molar relationships refers to the abnormal positional relations of teeth and jaws of both maxillary and mandibular arch. Different types of malocclusions are defined by various research scholars but Angle's classification of malocclusion is the most widely accepted. Competency of lips is an important factor for causing malocclusion as well as for determining the plan of treatment.[3]

Different studies associating lip prints with skeletal malocclusions have been carried out by many researchers but very few studies have been carried out between cheiloscopic patterns and Angle's molar relations. This study aims to provide an insight and explore the association between cheiloscopic patterns and Angle's molar relations.

## MATERIALS AND METHODS

The present study was done on 30 children in the age group of 14-16 years who came to the department of Orthodontics. Required ethical clearance was obtained from the institutional ethical committee. The steps and procedures of this study were explained in detail to the parents as well as children and informed consent was taken from those who were willing to participate in this study. As the subjects under study were minors, consent was obtained from parents.

### Inclusion criteria:
1. Children in the age group of 14-16 were included.
2. Children with all permanent teeth erupted and with complete occlusal development were included.

### Exclusion criteria:
1. Those with previous history of orthodontic treatment were excluded.
2. Those children with any type of injury (burn, chemical, lesions or any other trauma) on lips were excluded.
3. Those children with retained deciduous teeth or root stumps of primary teeth were excluded.
4. Those children with different molar relationships on either side were excluded.
5. Those children with any missing tooth which would affect the molar relation were excluded.

Two examiners assessed 30 children for recording Angle's molar relations and lip prints. One of the examiner recorded Angle's molar relations using diagnostic instruments. The other examiner recorded the lip prints once the molar relations were recorded.

Lip prints were recorded using method given by Sivapathasundaram et al.[5] Using wet gauze, the lips were cleaned and dried. Lipstick was applied using cotton buds to eliminate any chances of cross contamination and children were asked to rub the lips against one

another and there after the glue portion of cellophane tape was placed over the lips in resting position. The cellophane tape was carefully removed and was stuck on white paper. Smudged lip prints were discarded and were recorded again till clear prints were obtained.



**Figure 1: Procedure for recording lip prints.**

The lip prints so recorded were analyzed using magnifying glass (4x). The lip prints were analyzed based on classification by Suzuki and Tsuchihashi in 1971.

Tsuchihashi and Suzuki classification[6]
Type 1 – complete vertical
Type 1' – incomplete vertical
Type 2 – branched
Type 3 – intersected
Type 4 – reticular
Type 5 – undermined or irregular
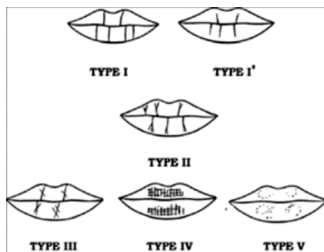


**Figure 2: Tsuchihashi and Suzuki Classification[7]**

The middle part of the lower lip (10 mm wide) was taken as study area, similar to the study by Vignesh R. *et al*. [4] and Sivapathasundharam *et al.*[5]

The data thus collected was statistically analyzed using SPSS software version 25 and Microsoft Excel.

**RESULTS:**
The mean age of the children was 14.67 ± 1.36 years. Amongst the children with class I malocclusion, males contributed to 22.2% while females contributed to 77.8% of the total children with class I

malocclusion. Amongst the children with class II malocclusion, 47.4% happened to be males and 52.6% happened to be females. Amongst the children with class III malocclusion, there was an equal distribution of 50% males and 50% females. (Table 1) The most predominant lip print pattern is Type I' (incomplete vertical). (Table 2)

A higher frequency of Type I' is seen in patients with Class II malocclusion followed by Class I malocclusion. An increase in frequency of Type V (undefined) pattern is seen in Class II malocclusion. On comparing lip print patterns with malocclusion, patients with Class II malocclusion showed an increased Type I' (incomplete vertical) lip print pattern, which was statistically significant (*p* value = 0.012) (Table 3). There was no statistically significant correlation between other classes of malocclusion and lip prints.

**TABLE 1: Gender based distribution of different classes of malocclusion.**

| GENDER | | ANGLE'S CLASSIFICATION | | | |
|---|---|---|---|---|---|
| | | I | II | III | TOTAL |
| MALE | COUNT | 2 | 9 | 1 | 12 |
| | % | 22.2% | 47.4% | 50% | 40% |
| FEMALE | COUNT | 7 | 10 | 1 | 18 |
| | % | 77.8% | 52.6% | 50% | 60% |

**TABLE 2: Frequencies of different types of lip prints.**

| LIP PRINT | FREQUENCY | PERCENTAGE |
|---|---|---|
| TYPE I | 4 | 13.3% |
| TYPE I' | 12 | 40.0% |
| TYPE II | 2 | 6.7% |
| TYPE III | 4 | 13.3% |
| TYPE IV | 3 | 10.0% |
| TYPE V | 5 | 16.7% |
| TOTAL | 30 | 100.0% |

**TABLE 3: Lip print distribution among different classes of malocclusion.**

| LIP PRINT | CLASS I | CLASS II | CLASS III | Chi Square P-value |
|---|---|---|---|---|
| TYPE I | 2 | 2 | 0 | 0.368 |
| TYPE I' | 3 | 8 | 0 | 0.012 |
| TYPE II | 1 | 2 | 0 | 0.368 |
| TYPE III | 1 | 2 | 1 | 0.779 |
| TYPE IV | 2 | 1 | 0 | 0.368 |
| TYPE V | 0 | 4 | 1 | 0.074 |

**DISCUSSION**
Over last 3 decades, there has been a tremendous interest among researchers about analyzing and correlating dermatoglyphic patterns, cheiloscopic patterns and different types of medical as well as dental diseases and conditions. Many factors affect the development of jaws, teeth and lip prints. These factors include environmental factors, genetic factors and external factors like physical and chemical trauma.

During the development, in the 6th week of intrauterine life, the facial structures including the teeth, jaws and lips as well as the finger prints develop concomitantly from the same tissue of origin that is the ectoderm.[8] So there is a possibility that a change in one of these structures can be associated with a change in the other structure. This formed the base of our study in analyzing and exploring the possible association of lip prints and malocclusion. Moreover, lip prints, analogous to finger prints, remain constant since the time they are formed unless affected by any pathology or mechanical trauma. Our study is an attempt to correlate different types of lip prints with malocclusion based on Angle's classification of malocclusion. The results of this study confirm certain correlations between different cheiloscopic patterns and different molar relationships.

In the present study statistically significant relation was found between Type I' (incomplete vertical) lip print pattern and Class II malocclusion. The findings of our study are contradicting the finding of Vignesh R *et al* [4] and Uma Maheswari *et al.*[3]

In this study, only the genetic factors affecting malocclusion or lip prints were considered. Environmental factors as well as local factors like trauma, caries or periodontal disease affecting molar teeth were not considered in determining the possible correlation. This can be considered one of the limitations of this study. Furthermore the sample

size of this study was small and hence larger sample sizes involving different age groups as well as children with different cultural and socioeconomic backgrounds will reveal a more precise correlation between the study parameters.

If larger sample size with a wider age range will be taken in future studies, maybe more correlations can be found. This study, if proved to show correlations between all classes of Angle's molar relations and lip prints, then maybe it can be used to predict future malocclusions by just recording and analyzing the lip prints of young children

## CONCLUSION

Keeping in mind the limitations of this study, cheiloscopy can be used as a non-invasive predictor tool for molar relations and can play a major role in preventive as well as interceptive orthodontic therapies particularly during the primary and mixed dentition phase of children. Larger sample size with children of different age groups and of different cultural-socio-economic background will provide a deeper insight and will be supporting the findings of this study.

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