RELATIONSHIP BETWEEN CHELIOSCOPY AND SKELETAL MALOCCLUSION: A HOSPITAL BASED STUDY

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ABSTRACT

Background: Lip prints play a critical role in the appropriate orthodontic therapy. Establishing a correlation between sagittal jaw relation and lip prints would benefit the clinician by predicting the type of malocclusion.
Objective:To compare the gender variation of lip prints and of sagittal skeletal jaw relation as well as to relate the different lip print patterns with those of sagittal skeletal jaw relations.
Materials and method:A descriptive, cross-sectional, hospital-based study involving 150 subjects was conductedin the Department of Orthodontics and DentofacialOrthopedics, AnnasahebChudamanPatil Memorial Dental college, Dhule..The study sample was evaluated to assess the sagittal discrepancy of the maxillary to mandibular skeletal bases. Lip prints were analysed using Tsuchihashi's classification.
Results: The mean age of the study subjects was 18.75± 2.37.Branched lip patterns were predominant among skeletal class I and class II whereas Vertical lip patterns showed predominance among skeletal class III patients.
Conclusion: The present study has shown that lip printscan be employed for sagittal jaw relation recognition.
Keywords: Chelioscopy, Sekeletal malocclusion, Lip prints, orthodontic treatment

INTRODUCTION:

An ideal orthodontic therapy is based on the appropriate diagnostic procedures and suitable analysis of relevant diagnostic data[1].Many soft tissue analysis are available among which lip prints play a pivotal role.[2-7]

Lip prints consist of normal lines and fissures in the form of wrinkles and grooves present in the zone of transition of human lip between the inner labial mucosa and outer skin. The study of these grooves or furrows present on the red part or the vermilion border of the human lips is known as cheiloscopy (from the Greek words, cheilos, lips, e skopein).[8]This biological phenomenon was first noted by an anthropologists R. Fischer in 1902.[9]The use of lip prints for human identification was first suggested in 1950 and researches were carried out in 1960s and early 1970s, resuming in the last few years.[9]

It is stated that fingers, palms, lip, alveolus, and palate develop during the same embryonic period.[10]Lip prints are established at a very early period in comparison to sagittal jaw relation and dental relation.[10,11]Any environmental or genetic factors affecting the process of development of dental hard tissues might affect and also get recorded in the sulci labiorumrubrorum. Establishing a correlation between sagittal jaw relation

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and lip prints would benefit the clinician by predicting the type of malocclusion. This forms the basis of comparison of sagittal jaw relation with that of lip prints.[11]

In context of the above, this study was designed to explore correlation of lip prints with skeletal base relationship. The objective was to compare the gender variation of lip prints and of sagittal skeletal jaw relation as well as to relate the different lip print patterns with those of sagittal skeletal jaw relations.

MATERIALS AND METHOD:

A descriptive, cross-sectional, hospital-based study was conducted in the Department of Orthodontics and DentofacialOrthopedics. Ethical clearance was obtained from the ethical committee of AnnasahebChudamanPatilMemorial Dental college,Dhule. Informed consent was obtained from each subject prior to the study. Patients having any developmental anomaly or any pathology on lips and jaws, those who were unable to open their mouth, Individuals with known hypersensitivityto lipsticks and those who did not give informed consent were excluded from the study. In this study, none ofthe subjects had undergone orthodontic treatment ormaxillofacial surgery previously.A pilot study was conducted on 30 patients (10 in each group) to know the feasibility and acceptability of the study. Based on the pilot study, a sample size of 150 subjects was found to be appropriate.A convenience sample of 150 patients, in the age group of 18–25 years, from the outpatient Department of Orthodontics was included in our study. The sample was equally allocated to three groups i.e., skeletal class I, II and III with equal number of males and females.

Digital lateral cephalogram

The lateralcephalograms andorthopantomographswere recorded. For taking the cephalograms, 6 kV,12 mA current and an exposure time of 0.8 sec was used. The study sample was evaluated to assess the sagittal discrepancy of the maxillary to mandibular skeletal bases (anteroposterior jaw discrepancy) with angular measurements of ANB given by Riedel[12].

Lip print recording

Fig 1: Method of obtaining lip print.

For the analysis of lip prints, the materials used were lipstick (Elle 18, 026 maroon iris), lipstick applicator, cellophane tape, white bond paper (Royal Executive Bond, 85 gm, Premium White A4 sheets), and magnifying glass. For recording the lip prints,lipstick-cellophane technique was used. Lips were initially wiped clean using tissue paper following which the lipstick was applied gently using a lipstick applicator from the central to the lateral portion of the upper lip with a single stroke. The subjects were then asked to clutch both the lips to ensure that the lipstick application was uniform. Following 2 min of waiting, the glue portion of the cellophane tape was used to obtain the impression of the lip. This record was immediately transferred on to a white bond paper as proposed by Sivapathasundaramet al.[13]by gently sticking the cellophane tape. Magnifying glass lens was used for the analysis of lip prints. (Figure 1)Tsuchihashi's classification of lip printwas used to analyze the lip prints.[14]

Tsuchihashi's classification for lip print identification[14]

Type 1: Clear-cut grooves running vertically across the lips 

Type 2: Branched grooves 

Type 3: Intersecting grooves 

Type 4: Reticulate grooves 

Type 5: Undetermined 

Statistical analyses

SPSS 20.0 version software was used for statistical analysis. A confidence interval of 95% and a significance level of 5% were set.Descriptive of categorical variables were summarized as frequencies. Inferential statistics was performed using Chi – Square test.

RESULTS:

There were 50 subjects each in the three groups, accounting to a total of 150 subjects. The mean age of the study subjects was 18.75± 2.37.

Table 1 shows the distribution of different lip patterns among the study subjects. Branched lip pattern was most common (34.0%) followed by vertical (32.0%), intersected (19.3%), reticular (12.0%) and undetermined lip pattern (2.7%).Branched lip patterns were predominant (36.0%) among males; however, in females vertical and branched lip patterns (32.0%) were predominant. The Chi Square test showed no significant difference in lip patterns among male and female subjects.

Table 1: Distribution of different lip patterns among the study subjects

Gender	Types of lip prints										p value
	Vertical		Branched		Intersected		Reticular		Undetermined		
	n	%	n	%	n	%	n	%	n	%	
Male (n = 75)	24	32.0%	27	36.0%	13	17.3%	9	12.0%	2	2.7%	> 0.05

Female (n = 75)	24	32.0%	24	32.0%	16	21.3%	9	12.0%	2	2.7%	> 0.05
Total (n = 150)	48	32.0%	51	34.0%	29	19.3%	18	12.0%	4	2.7%	
Pearson Chi – Square = 0.487; df = 4; p value < 0.05 significant											

Table 2 shows the prevalence of different lip patterns according to skeletal malocclusion. 38.0% of skeletal class I malocclusion showed branched lip patterns, however, only 4% showed undetermined lip patterns. Among skeletal class II, 42.0% displayed branched lip patterns. In contrast, vertical lip patterns (40%) were predominant in skeletal class III subjects. All the differences among skeletal malocclusions were non significant.

Table 2: Prevalence of different lip patterns according to skeletal malocclusion

Skeletal Jaw Relation	**Lip Print Patterns**										**p value**
	Vertical		Branched		Intersected		Reticular		Undetermined		
	n	%	n	%	n	%	n	%	n	%	
Skeletal Class I (n = 50)	13	26.0%	19	38.0%	9	18.0%	7	14.0%	2	4.0%	> 0.05
Skeletal Class II (n = 50)	15	30.0%	21	42.0%	9	18.0%	4	8.0%	1	2.0%	> 0.05
Skeletal Class III (n = 50)	20	40.0%	11	22.0%	11	22.0%	7	14.0%	1	2.0%	> 0.05
Total (n = 150)	48	32.0%	51	34.0%	29	19.3%	18	12.0%	4	2.7%	
Pearson Chi – Square = 6.695; df = 8; p value < 0.05 significant											

Distribution of lip patterns was almost similar in skeletal class I and class II study subjets (Table 3, Graph 1).

Table 3: Comparison of different lip patterns among Skeletal Class I and Class II malocclusion

Lip Patterns	Skeletal Class I	Skeletal Class II	p value
Vertical	13	15	> 0.05
Branched	19	21	> 0.05
Intersected	9	9	> 0.05
Reticular	7	4	> 0.05
Undetermined	2	1	> 0.05
Total n = 150	50	50	
Pearson Chi – Square = 1.394; df = 4; p value < 0.05 significant			

However, skeletal class III reported significantly higher proportion of vertical and branched lip patterns as compared to skeletal class I study subjects (Table 4, Graph 1).

Table 4: Comparison of different lip patterns among Skeletal Class I and Class III malocclusion

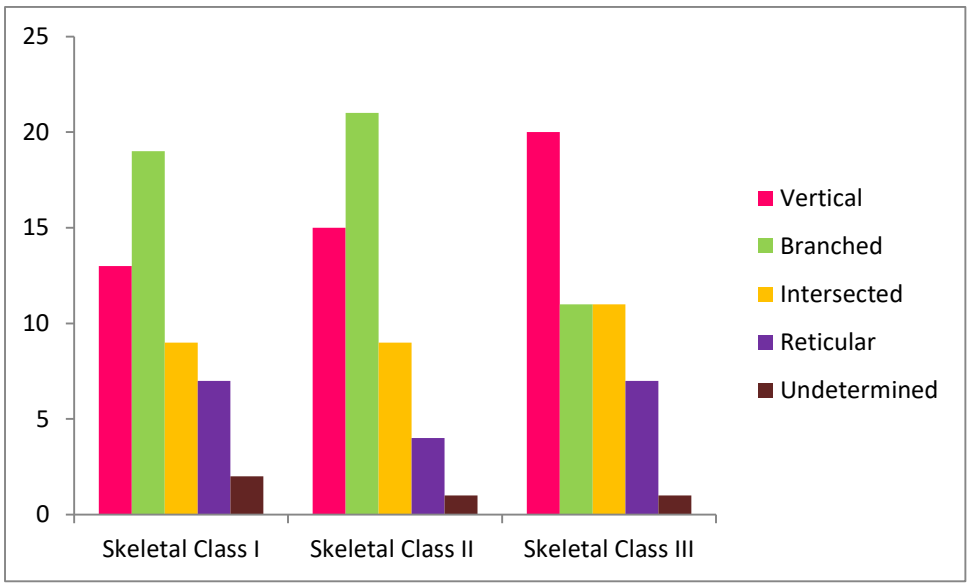
Lip Patterns	Skeletal Class I	Skeletal Class III	p value
Vertical	13	20	< 0.05*
Branched	19	11	< 0.05*
Intersected	9	11	> 0.05
Reticular	7	7	> 0.05
Undetermined	2	1	> 0.05
Total n = 150	50	50	
Pearson Chi – Square = 4.152; df = 4; p value < 0.05 significant			

Similar results were echoed when lip patterns were compared among skeltal class II and III study subjects (Table 5, Graph 1).

Table 5: Comparison of different lip patterns among Skeletal Class II and Class III malocclusion

Lip Patterns	Skeletal Class II	Skeletal Class III	p value
Vertical	15	20	< 0.05*
Branched	21	11	< 0.05*

Intersected	9	11	> 0.05
Reticular	4	7	> 0.05
Undetermined	1	1	> 0.05
Total n = 150	50	50	
Pearson Chi – Square = 4.857; df = 4; p value < 0.05 significant			



Graph 1: Comparison of different lip patterns among various skeletal malocclusions

DISCUSSION:

The soft tissue diagnosis is the corner stone of the orthodontic treatment. One of the emerging diagnostic tool in this field is *cheiloscopy*. A per our data search, very few studies have related malocclusion to cheiloscopy.

The present study used Suzuki and Tsuchihashi's classification.[14]This is the most widely used classification in the literature. It described six types of lip print patterns i.e. Vertical, Branched, Intersected, Reticular and Undetermined. In the current study, branched lip patterns (34.0%)were predominant while as undetermined lip patterns (2.7%) were the least observed. Similar results were echoed by Raghav et al, [15]Kulkarni et al, [16]and Bindal U et al.[17] In contrast, Tsuchihashi[14], Sivapathasundharam[13], Kaushi et al., [18]found that intersectedlip pattern was the most frequent.Vergheseet al., [19] in Keralafound that reticular lip pattern showed the highestincidence.

No significant differences were found in the lip patterns of the male and female subjects. Thisis in accordance with the study of Tsuchihashi[14],Raghav et al,[15]Bidal U et al., [17] and Vergheseet al., [19]. But in studies of Kulkarni et al, [16] Kaushi et al.,[18] Narang et al.,[20] and Babu*et al.*,[21] difference in lip patterns of males and females was observed.

On assessment of lip patterns in different skeletalmalocclusions, our study showed branched and vertical patterns as most prevalent in class I and II malocclusion subjects. Therewas no significant difference between the lip print patternsof class I and class II subjects, whereas,in individuals withskeletal class III vertical lip pattern was most prevalent. The presence of vertical lip print patterns inclass III subjects was significantly different from class I andclass II subjects (P <0.05).Similar results were reported by ,Raghav et al, [15] Kulkarni et al, [16] and Shivani Y et al [22].

CONCLUSION:

The present study has shown that lip printscan be employed for sagittal jaw relation recognition.A significant correlation was found between verticallip pattern and skeletal class III malocclusion, eventhough class I and class II relationship with lip printswas inconclusive.Chelioscopyasa marker for skeletal malocclusion is still in its initial stages.Chelioscopyalone whether can be considered as a factor to diagnose malocclusionis still questionable. To validate the correlation oflip patterns with different skeletal malocclusion, an extensive research involving large sample from different ethnical background is required.

If chelioscopy is proven tobe an acceptable diagnostic tool, it can help in identifyingmalocclusion at an early age and thus help in preventive andinterceptive orthodontic treatment.

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