

An Assessment Of Inheritance Pattern Of Lip Prints In North Indian Population

Abstract

Introduction- Lip prints are normal line and fissures in the form of wrinkles and grooves present on the lips. Lip prints are similar to fingerprints and have an individual characteristic. Lip prints provide us important information and have become an important tool in forensic identification.

Lip prints are unique to each person but basic lip prints patterns could still have similarities within the family. If established that there is a hereditary pattern in lip prints patterns, can be an important tool in personal identification and determining familial lineage of a person.

Aim And Objectives- Therefore, present study was carried out to ascertain whether there is any hereditary pattern in lip prints patterns between parents and offspring's.

Methodology- The subjects for the investigation included 90 individuals of 30 families from north Indian origin population. Father, mother and a son or daughter of each family was selected The lip prints of either son or a daughter along with their father and mother from each family were recorded. Each lip of the 30 offspring was compared with the corresponding lip of his or her parents. The middle segments of each lip of the offspring that matched with either of the parents was noted and recorded. The results were evaluated by two way Anova and Karl-Pearson correlation coefficient tests.

Results- Among 30 families, in 25 families the lip print patterns of child were similar to either of parents. Karl-Pearson correlation coefficient showed a strong positive & significant correlation between parents and their offspring's ($p < 0.05$).

Conclusions- There was statistically significant resemblance of offspring lip prints with parents lip prints. Our result indicates the role of heredity in lip prints. Comparison of lip prints within members of the family might give valuable indications for the identification of the suspect and help in determining family lineage of a person.

Key Words

inheritance, wrinkles, grooves, population, lip prints

Introduction

Lip prints have been used since long for criminal identification but have a limited role in forensic identification. Lip prints are normal line and fissures in the form of wrinkles and grooves present in the zone of transition of lips between inner labial mucosa & outer skin^[1]. Examination of lip prints is called as cheiloscopy. Lip prints are unique and do not change during the life of a person. It has been verified that they recover after undergoing alterations like trauma, inflammation and diseases like herpes^[2]. The disposition and form of the furrows does not change with environmental factors^[3].

Lip prints are similar to fingerprints, palm prints and footprints in that it is an individual characteristic. Evidence of lip prints left at the crime scene is similar to finger prints. Lip prints provide us important information regarding identification of suspects and have become an important tool in forensic identification^[4].

The last few decades have seen the development of the lip prints as another skin impression, which may be useful in forensic identification.

Lip prints are unique to every individual; MacDonnell^[5] reported that two identical twins which were indistinguishable by other means had different lip prints. Some of the great work on lip prints has been done by Japanese doctors Suzuki and Tsuchihashi which includes formulation of the widely used lip prints classification^[6]. They reported that Lip prints of the twins and their parents were not identical, and that their lip groove pattern could be influenced by hereditary factors^[7]. This finding was important due to the fact that both uni-ovular twins contain the same DNA but not the same fingerprints and lip prints. The only other analysis of lip prints connected with families found was reported by Hirth, (1975)^[8] in which they suggested a genetic basis of lip prints Lip print patterns of parents and children and those of siblings have shown some similarities.

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Lip prints are unique to each person but basic lip prints patterns (as given by Tsuchihashi) could still have similarities within the family.

If established that there is a hereditary pattern in lip prints patterns, it can be an important tool in personal identification and determining familial lineage of a person. Therefore, present study was carried out to ascertain whether there is any hereditary pattern in lip prints patterns, and thereby, to investigate the potential role of lip prints in personal identification.

Materials And Method

The subjects for the investigation included 90 individuals of 30 families from north Indian origin population. Father, mother, and a son or daughter of each family were selected. A written informed consent was taken from each subjects, In case of minor subject consent was taken from either of the parent. Following materials were used in recording lip prints.

- red colored lipsticks and lipstick brushes.
- a cellophane tape.
- white colored bond papers.

- a magnifying lens
- a scissor, pencil, cotton
- Gloves, a wall mirror

Criteria for sample selection:

The subjects had no congenital facial defects, no lesions on the lips and no known hypersensitivity to any of the above material used. To ascertain the inheritance of lip prints, and 30 families with offspring's were studied. The lip prints of either son or a daughter along with their father and mother from each family were recorded. Each lip of the 30 offspring was compared with the corresponding lip of his or her parents. The middle segments of each lip of the offspring that matched with either of the parents was noted and recorded.

Method

The subjects were asked to sit at relaxed position on dental chair, and the lips of the subjects were cleaned with the help of wet cotton. Then a portion of red colored lipstick was cut from the top of the lipstick with the help of bard parker knife and this portion was put into the dappen dish, and the lipstick was taken from the dappen dish and applied on the lips with the lip brush. The subjects were asked to rub both the lips to spread uniformly the applied lipstick. Over the lipstick, the glued portion of the cellophane tape strip was placed and a lip impression was made by dabbing it in the center first and then pressing it uniformly towards the corners of the lips. The cellophane strip was then stuck to the white bond paper for permanent record purpose and then lip impressions were subsequently visualized with the use of a magnifying lens, and recorded In this study, the classification of patterns of the lines on the lips proposed by Sujuki & Tsuchihashi^[6], was followed as ;

- Type I: Clear-cut vertical grooves that run across the entire lips.
- Type I': Similar to type I, but do not cover the entire lip.
- Type II: Branched grooves (branching Y-shaped pattern).
- Type III: Intersected grooves. Criss-cross pattern, reticular grooves.
- Type IV: Reticular grooves.
- Type V: Grooves do not fall into any of the type I-IV and cannot be differentiated morphologically. (Undetermined).

Results

TOTAL LIP PRINTS AND THEIR PATTERNS

TOTAL SAMPLE =90
Family =30

In off springs there was 83.33 % resemblance with parents lip prints out of 30 families.

Among 30 families, in 25 families the lip print patterns of child were similar to either of parents. Two way anova test revealed a significant difference in type of lip prints found in different families ($p>0.05$).when compared within same family there was no significant difference between parents and offsprings.

Karl-Pearson correlation coefficient also showed a strong positive & significant correlation between parents and their offspring's ($p>0.05$).

Among 25 families showing resemblance, in 14 family's father's lip prints resembled Childs lip prints while in 11 families mother's lip prints resembled Childs lip prints (**Figure 1 a & b**).

Z-test was applied to test the resemblance of lip prints to mother and father separately in the family. Z-test showed positive correlation with both parents.

The resemblance of patterns of lip prints between father and offspring was found to be statistically significant ($z=1.978$, $p<0.05$). Similarly the resemblance of patterns of lip prints between mother and offspring was also found to be significant (and $z=2.466$, $P<0.05$).

Discussion

Most of the studies on lip prints had yielded varying results for different populations. In our population vertical lip prints were most predominant while Tsuchihashi Y (1974)^[7] in his study on Japanese population found that intersected lip pattern was the most frequent. Vahanwalla and Parekh (2000)^[9] in their study in Mumbai found that vertical lip pattern was most common. Sivapathasundharam et al (2001)^[10] studied the lip prints of Indo-Dravidian population and noted that intersected lip pattern was predominant. These studies indicate that there exists lot of regional variation among different populations.

Our study showed 83.3 % resemblance between parents and Childrens. The offspring's lip prints in our population showed strong resemblance with parents as there was no statistically significant



Figure 1(A) Lip prints pattern seen in two families. Father (Branched), Mother (Branched), Daughter (Branched)

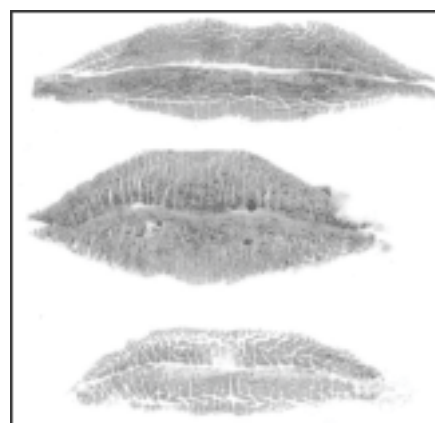


Figure 1(B) Lip prints pattern seen in two families. Father (Intersected), Mother (Vertical), Daughter (Intersected)

Table 1

Types	Father	Mother	Son/Daughter	
			Lip Print Patterns In Son / Daughter	Lip Prints Patterns In Childs Matching With Either Of Parents (25)
Type I	12	10	11	09
Type II	08	07	08	07
Type III	04	08	08	06
Type IV	05	05	03	03
Type V	01	0	0	0
	30	30	30	25

difference between the offspring's and parents lip print patterns(p -value = 1, $p>0.05$ **Table 3**)this is in accordance with study of J.Augustine et al(2008)^[11]. Both mother and father showed strong positive & significant correlation between parents and their offspring's indicating that lip print patterns do have a family linkage. This study indicates that there might be

Table 2. The Karl -Pearson's correlation coefficient shows strong positive & high significant association b/w mother & children* (P<.05) and Father & children* (p<.05) respectively at =.05 level of significance

S. No.	Paires Of Family Members	Corelation Coefficients	P- Value / Significance
1	Mother & Children	.9730*	P< .05 (Significant)
2	Father & Children	.9143*	P< .05 (Significant)

an inheritance pattern for lip prints from parents to offspring's. A strong inheritance phenomenon of lip patterns has also been proved by studies of Hirth et al (1975)^[8] and Schnuth et al (1992)^[12], who found that heredity plays important role in lip print development as similarities were found between parents and children.

Hence, in accordance with previous studies, our results also provide further evidence to the role of heredity in lip prints. Our study indicates that lip print patterns of childrens shows a marked similarity with parents and can be used for comparison of lip prints within members of the family. Lip print patterns can also be used in determining the family roots of person. However non resemblance of lip print patterns cannot be ruled out as negating parent child relationship therefore further detailed study is required to draw final conclusions.

Conclusions

1. In north indian population vertical lip pattern was most common than any other type of lip pattern.
2. There was statistically significant

Table 3. Anova: Two-factor Without Replication Showing Strong Association Between Parents And Childrens

Source of Variation	SS	Df	MS	F	P-value	Significance	F crit
Among the Type of LIP Prints	185.3333333	4	46.33333333	29.26315789	0.000079*	P< .05 *(Significant)	3.837853355
Persons (Father/Mother & Children)	0	2	0	0	1	P > .05(N.S.)	4.458970108
Error	12.66666667	8	1.583333333				
Total	198						

resemblance of offspring lip prints with parents lip prints.

3. Male offsprings showed more resemblance with mothers while female offsprings showed more resemblance with father.

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