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To Study On Inheritance Of Lipprint Pattern Among The Family Members"

1Ms Lekshmi Krishnan, 2Dr Kannan Balakrishnan

1Research Scholar, 2Professor

1Jain deemed to be University, Kochi,

2Jain deemed to be University

ABSTRACT

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 individual characteristics. 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. The present study was carried out to ascertain whether there is any hereditary pattern in lip prints between parents and offspring's. The subjects were included 90 individuals of 30 families from Kollam district. 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 parents was noted and recorded. The results were evaluated by Chi-square test.

CHAPTER: 1

INTRODUCTION

Lip prints are considered to be an important form of transfer evidence, analogous to fingerprints, and can be very useful in forensic investigations and personal identification. Every human begins exhibit their own pattern of characteristics which is responsible of individualization of a person. Lip print is an anatomical character of the human lips. Lip prints are the characteristic patterns of the fissures (sulci labiorum) in the form of elevations and depressions on the labial mucosa present in the zone of transition between the inner labial mucosa and the outer skin (Suzuki et al., 1968). It is possible to identify the lip patterns as early as the sixth week of the intrauterine life (Caldas.IM et al., 2007). They are unique and do not change during the life of a person (Sivapathasundharam. B 2001) .The study and evaluation of LPs (i.e., lip marks), based on the assumed concept of labial grooves'

uniqueness, is termed cheiloscopy or queiloscopy . Lip prints recover even after trauma, inflammation and diseases like herpes and can be recognized without difficulty (Augustine J, et al., 2008).Similarity in the lip print patterns in members of the same family are seen supporting that hereditary factors also play a role in lip prints (Suzuki K, Tsuchihashi Y.,1970) . Hence lip patterns are unique, permanent and rarely change with age, resisting many tribulations and thus can act as a potential tool in identification process (Kinra M, et al., 2014)

Personal identification methods (Kaur R, Garg RK 2007) are employed for the identification of an unknown deceased as well as for exclusion, inclusion or identification of the suspect (Vahanwala S et al., 2005).Identification of a living or deceased person using unique traits and characteristics is the basis of forensic investigation. Fingerprint and DNA analysis are the most commonly used and well-established techniques used for such identification. In certain circumstances, when these evidences are not available, there is a hunt for alternative techniques that can be used. (Caldas et al., 2007). The investigators can rely on lip prints as supportive evidence in specific investigations.

The oily and moist secretions from sebaceous and salivary glands located at the vermillion border and subsequent moisturization from the tongue enables the formation of a latent lip print whenever there is contact (Ball, 2002) and is likely to be encountered and should be suspected to be present on the scene of the crime of burglary, sexual assault, house tress-pass, homicide, rape, etc. Depending upon the scenario of/at the crime scene, lip prints may be found on various physical evidences at the crime scene, such as shirt, handkerchief, tissue paper/wipes, cups, photographs, letters, glass, window panes, cutlery, fruit skin/peel, cigarette butts, clothing, and even biological materials such as skin (Kavitha et al., 2009, Vats et al., 2012).

Lip prints are very useful in forensic investigations and are considered to be important forms of transfer evidence, and are analogous to fingerprints (Tsuchihashi, 1974). Apart from identification and evidential use, lip prints may also be used in detection work, being the source of tactical and criminalistic information. Being unknowingly left at the scene of the crime, lip prints can directly and effectively be helpful in placing the suspect on the scene (Satyanarayana et al., 2011). A lip print at the scene of crime can be a basis for conclusions as to the character of the event, the number of the people involved, sexes, cosmetics used, habits, occupational traits, and the pathological changes of lips themselves (Vahanwala and Parekh, 2000). If a complete match or identification is not possible, proper examination of lip prints may help in establishing other relative facts like sex identification of the donor, hence reducing the burden of the forensic examiner to half.

Cheiloscopy may thus prove valuable in criminal profiling (Prabhu R et al., 2013). Neo et al. showed that proper LP analysis could be useful in estimating gender, race, crime type, as well as the number of persons involved in a crime (Neo X et al., 2012). (Fonseca GM et al.,2014) reported a useful review of real cases that utilize cheiloscopy . LPs are common on surfaces such as clothes, drinking cups and glasses, cigarette butts, envelopes, and cutlery items, and may be visible (patent) or invisible (latent). Latent LPs are common because of increased use of so called transfer-resistant or permanent lipsticks, and the fact that most males generally wear no lipsticks

at all (Segu MA et al., 2000). Enhancement of latent LPs relies on the reaction of sweat and sebum constituents deposited on surfaces with chemical agents (Sabarinath B et al., 2012).

Lip prints are unique to every individual; (Dr. Anil Aggrawal , 2004). In 1967, Suzuki made a detail investigation of the measurement of lips, the use and the color of rouge and method of its extraction to obtain useful data for forensic application (Saraswathi TR et al., 2009). Later in 1971 Suzuki and Tsuchihashi, conducted a study and they devised their own classification (Prabhu RV etal.,2012) MacDonnell 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 (Suzuki K. and Tsuchihashi Y, 1970) classification. 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 (Tsuchihashi Y, 1974) factors. 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, (Hirth L, Gottsche H et al., 1975) 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. Understanding inheritance patterns enable geneticists to predict the probability of an offspring inheriting certain traits from parents (Ordu et al.,2014; 2016), and Louis et al. (2012) explained that the manner and pattern in which gene is passed to offspring to produce traits bring about; single gene inheritance, sex-linked inheritance, multi-factorial or polygenic inheritance, mitochondrial inheritance.

Classification:

Suzuki and Tsuchihashi, in 1970, devised a classification method of lip prints, which follows:

1.TypeI: A clear-cut groove running vertically across the lip.

2.TypeI': Partial-length groove of Type I.

3.TypeII: A Branched groove.

4.TypeIII: An intersected groove.

5. Type IV: A Reticular pattern

6. Type V: Other patterns.

This classification is the most commonly used for recording the pattern on the lips.

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.

CHAPTER: 2

REVIEW OF LITERATURE

This chapter discusses the available knowledge including substantive findings, as well as the theoretical and methodological contributions towards lip print pattern. Various studies and findings are discussed here.

Prateek Rastoga and Amrita Parida (2011) 'Lip prints - an aid in identification' stated how to analysis lip print pattern. Also this paper details that whether the lip print in same throughout life and uninfluenced by environmental changes, disease and trauma. The author study was conducted a study among the medical students of Kasturba Medical College, Mangalore, India . A total of 200 randomly-selected medical students of Indian origin, belonging to age group of 18–25 years were used in this study. The sample consisted of 100 north Indians (50 males and 50 females) and 100 south Indians (50 males and 50 females). In the study, he adopted Suzuki's classification for the analysis of lip print. At the end of the study showed that lip prints are individualistic and bears a relationship with sex and geographical distribution of the individual.

Manickam selvamani et al., (2016)'Study of lip print pattern in Kerala sample population' deals with the distribution of lip print pattern among males and females and to determine the most common lip pattern in the study population. The study group consisted of 100 Kerala students in the age group 17-25 years. Lip prints were obtained by applying lip liner evenly on lip. Lip impression was made on the glued side of a transparent cellophane tape which was then transferred on to a white sheet for permanent record. Lip print patterns were classified according to Tsuchihashi et al. Conclusion of the study was the Type III pattern was the most common lip pattern among the whole study population. In males, the predominant lip print pattern was type III, followed

by type I and type II. In females, the predominant lip print pattern was type III, followed by type II and type I'. There was no statistically significant difference between the distribution of lip print patterns in males and females.

Yogesh Vats et al., (2011) 'Heritability of lip print patterns among North Indian population' deals with similarity of lip print pattern among parents and children. The total sample size of the study consisted of 1399 individuals in the age group of 8-60 years belonging to Brahmins, Jats and Scheduled castes from Haryana and Delhi. Among the three population groups, the maximum percentage of resemblance is shown by the Brahmin mothers and daughters in the lower lip quadrant. The minimum exhibited by Scheduled Castes fathers and sons in the left upper quadrant (9.09%).The final conclusion was there is persists resemblance among parents and children in their lip print pattern.

Dr. Ankur Bhargava et al., (2019) 'Chelioscopy a Novel tool for personal identification and sex determination 'stated that to check for any peculiar lip print pattern in relation to the sex of individual. The study consists of group of 100 undergraduate students (50 male and 50 female) in the age group of 18-23 were chosen randomly. He used Non-glossed lip stick color, white bond paper, cellophane tape, scissors, and magnifying lens were used to obtain lip prints. Lip Prints were analyzed with the help of a personal computer and Adobe Photoshop software. The lip print pattern of middle part of lower lip was considered, as it is visible in almost all the prints. Result of the study was Majority of the study group (28 people -28%) belonged to Type IV and 6 people (6%) belonged to Type V group. The most common pattern found in female was II, while type IV was predominant among males. Study show lip prints have great potential to establish individuality, show gender variation and remain unchanged forever.

Mahkameh Moshfeghi et al., (2016) 'Morphological patterns of lip print in an Iranian Population' deals with individuality and variability of lip prints. In his study includes 96 individual comprised of 22 males and 74 females. The samples were recorded on a plain white paper using a dark-colored lipstick.. Each lip print was divided into six sextants and studied independently by two observers using a magnifying lens to examine the lip grooves. The Suzuki and Tsuchihashi's classification was used to define the lip patterns and the data were statistically analyzed. Results of the study, no identically similar lip prints were observed. Type V was the most predominant pattern recorded in the study sample (33.16%), followed by type I (24.13%), type II (18.75%), type IV (11.63%), type I' (9.72%) and type III (2.60%). In addition, no statistically significant difference was observed in the lip print patterns of males and females. Study can be concluded that lip prints are unique and their analysis may enable human identification.

Neeti kappor, Ashish Badiye (2015) 'A study of distribution, sex difference and stability of lip print pattern in an Indian population' stated that to predominant lip print pattern found among a central Indian population. The study included 200 healthy adult subjects comprising of 100 males and 100 females in the age group of 18–25years. Author used convenient and easier method of data collection i.e., digital photography instead of the traditional lipstick methods. Lip prints were recognized as per Suzuki and Tsuchihashi classification. Based on

the result Type I(30.63%) was found to be most predominant overall in the Marathi population. Type 1(29.75%) and Type III (35.75%) were found most prevalent in males and females respectively. Chi -square test was used for the statistical analysis of dat. While applying the Chi-Square test, statistically significant differences ($p < 0.05$) were observed between male and female lip print patterns in each of the quadrants individually.

Maxwell Abedi et al., (2020) 'Lip print enhancement review' states that how to enhance the latent lip print on porous and Non-porous. The physical and chemical methods are used for the lip print enhancement. The study emphasized the current scope of research regarding physical and chemical enhancement of latent and visible. It helps to understand the structural variations and composition of lip print as well as a systematic method of development and validation using robust experimental design.

Ragini Miglani et al., (2016) 'inheritance pattern of lip print among Haryanvi population' was conducted a study is based on study of familial patterns of lip prints in Jats and Baniyas of Haryana. It includes 40 Haryanvi Baniya and 40 Haryanvi Jat families (4 or more members in two generations) residing in Haryana for the past 10 or more years. Lip Prints are recorded by using glued portion of the cellophane tape was applied on the lips (upper and lower together) of the subject and photographs of the lip prints were recorded and analyze. Final result of Ragini Miglani in Haryanvi Baniyas was daughters showed more percentage of inheritance of lip prints than that of sons, also daughters inherited more patterns from mothers than from fathers. In Haryanvi Jats, sons inherited equally from both parents whereas daughters inherited more from mothers .Type IV (reticular) pattern was found to be inherited in maximum percentage both among Baniyas and Jats. Percentage resemblance among fathers and sons is maximum in left lower lateral quadrant whereas among fathers and daughters, it is maximum in left lower medial quadrant in Haryanvi Baniyas. Between mother and children of Haryanvi Baniyas, percentage resemblance is maximum in right lower medial quadrant in case of sons and left lower medial quadrant in case of daughters.

Khanapure et al. (2014) summarized the view that statistically significant association existed between gender and lip print patterns, whereas the association between geographic location and lip print was not statistically significant. They also reached a conclusion that the distribution of lip prints is unique for males and females and the association between geographic location and lip print was not statistically significant.

CHAPTER: 3
RESEARCH METHODOLOGY

This chapter discusses the methodology adopted by the researcher for conducting the study. A Research Methodology is both “the collection of methods or rules” you apply to your research, as well as the ‘principles, theories, and values” that support your research approach (Somekh & Lewin, 2005).Research methodology as the prescription of the acceptable ways of doing research. It defines how to proceed, how to measure progress

and what constitutes a success. It is a science of research how to carried out. Essentially the procedure by which researchers go about their work of describing, explaining and predicting phenomena are called research methodology. It is also defined as the study of methods by which knowledge is gained. Its aim is to give work plan of research (Rajasekar, Philominathan and Chinnathambi, 2006).

The present chapter discusses about the objectives of the study, significance of the study, scope of the study, universe, sampling techniques, hypotheses framed for the study, research design, variables, method of data collection and data processing and analysis.

3.1 OBJECTIVE:

- To study the possibility of the offspring to inherit the lip print patterns from their parents
- To find the most common type of lip Print pattern among whole sample.

3.2 SIGNIFICANCE OF THE STUDY:

Lip prints have a good potential for use in criminal investigations. They have been used only occasionally despite their frequent occurrence at crime scenes. Lip marks can be observed on ordinary drinking glass by an individual, even without lipstick being applied. Hence, taking lip prints of all the suspected individuals and comparing with any such item found at the scene of crime could give conclusive evidence on the presence/absence of a person and should be admissible even in the court of law. There is a potential influence of inheritance in the lip print pattern among the family members even though the lip print pattern are individual and unique for each person. Lip print inheritance help to identify the suspect by comparing the lip pattern of their parents.

3.3 SCOPE OF THE STUDY:

Heredity may play an important role in lip print development, ethnic groups geographically closely located tend to share similar patterns of lip prints in comparison to more distant populations, so a characteristic lip pattern may indicate a person's geographical and racial origin, of transfer evidence, analogous to fingerprints, and can be very useful in forensic investigations and personal identification. The latent lip prints can be developed by using a wide variety of chemicals, ranging from conventional powders to lysochrome dyes (for persistent lipstick prints). This trace evidence can provide information on the basis of the conclusion of the sex, occupation, habits, cosmetic used, and the pathological change to narrow down the investigation. Comparison of lip print within members of the family might give valuable indication for the identification of the suspect.

3.4 UNIVERSE OF THE STUDY:

The universe of the study consists of all survey elements the qualify for inclusion in research study (Lavrakas, 2008).

- Age ranging in between 10-50
- A total of 90 individuals of 30 families
- Subjects are from a particular region (Kollam region) which comprises of lip print pattern of parents and offspring.

3.5 SAMPLING TECHNIQUE:

Sampling is an act, process or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population (Fridah, 2002).

- The sampling technique used here is simple random sampling.
- A total number of 90 individuals of 30 families which comprises of father, mother, and offspring's.
- The samples have been selected from Kollam district.

3.6 HYPOTHESIS:

H1- There is an association between lip print pattern of parents and their child.
H0- There is no association between lip print pattern of parents and their child.
H1- There is a common type of lip print pattern among whole sample.
H0- There is no common type of lip print pattern among whole sample.

3.7 RESEARCH DESIGN:

Research design is a "blue print for conducting a study with maximum control over factors that may interfere with the validity of the findings" (Burns and Grove, 2003). The study follows an association method. In this method, the Lip print pattern of parents and their child will analyze. It will help to determine the inheritance of lip print pattern.

3.8 VARIBLES:

A variable is a constant or abstract idea that can be described in measurable terms. Variables are defined as something that can change or can have more than one value. According to Kerlinger (1983), “variable is a property that takes on different values”. It is a logical grouping of attributes (Babbie, 1983). There are different types of variables and one of its classifications is independent and dependent variables. The independent variable is the antecedent and dependent variable is the consequent (Kaur, 2013).

The independent and dependent variables of the study are given below;

Independent variable: Gender

Dependent variable: Lip print pattern

3.9 SOURCE OF DATA

Primary data source consists of lip print of parents and children will be providing the inputs for the study.

Secondary data source of study reports and other documents pertaining to the study.

3.10 DATA PROCESSING AND ANALYSIS

Statistical tool of data interpretation and analysis is to be used to arrive at a scientific understanding of the problem in its various dimensions. SPSS (Statistical Package for the Social Science) were used for the data analysis. SPSS is statistical software which is used to solve analytical data, research and decision making in business. Here, SPSS software is used to analyze the data with the help of Chi-square test. Chi-square test is used to test relationship between categorical variables.

3.11 INCLUSION CRITERIA:

Families from Kollam region.

3.12 EXCLUSION CRITERIA:

Subjects having congenital abnormalities, inflammation or trauma and known hypersensitivity to lipstick.

3.13 MATERIALS AND METHOD

The samples for the investigation included 90 individuals of 30 families, age group between 10 to 60 from the population of Kollam district. Father, mother, and a son or daughters of each family were selected.

3.13.1 TOOLS

Dark colored, non- persistent, non- glossy, non -metallic with less moisture and oil content lip stick, a cellophane tape, white colored bond papers, ,a scissor, pencil, are the materials used in recording lip prints. In this study, Suzuki and Tsuchihashi classification method were used for analysis.

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 20 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 20 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.

3.13.2 METHOD OF COLLECTION

The lips of 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 blade. Then, the lipstick was applied on the lips and subjects were asked to rub both the lips to spread uniformly applied lipstick. Over the lipstick, the glued portion of the cellophane tape was placed on it. Then cellophane strip was clear fully take from the lips and was stuck into the white bond paper for permanent record purpose. The lip print impressions were analyzed by using Suzuki and Tsuchihashi classification.

CHAPTER : 4
RESULT AND DISCUSSION:

The data with regard to the present study was collected from Kollam District comprising of 90 individuals of 30 families, age group between 15-60 and father, mother and offspring's of each families were selected. The data collected have been scored and analysed using Statistical Package for Social Science (SPSS).

The frequency table include lip print pattern of father, mother and offspring's, lip print pattern in child matching with either of parents and total occurrence of lip print pattern.

TABLE NO: 1

FREQUENCY TABLE BETWEEN PARENTS AND THEIR OFFSPRING'S

Types	Father	Mother	Lip print pattern in son or daughter
Type1	7	11	13
Type2	2	6	2
Type3	9	4	10
Type4	8	8	3
Type5	3	1	1
Type6	1	0	1
	30	30	30

In this study, type 1 lip print pattern shown by 7 father, 11 mother and 13 offspring's. Out of total sample, 31 samples shows type 1 pattern. Type 2 lip print pattern shown by 2 father, 6 mother and 2 offspring's. Total 10 samples shows type 2 lip print pattern among whole samples. The 9 father, 4 mother and 10 offspring's shows type 3 lip print pattern. Among the whole sample, total 23 samples shows type 3 patterns. Type 4 lip print pattern shown by 8 father, 8 mother , 3 offspring's and total number of 19 samples shows this pattern. Type 5 lip print pattern shown by 3 father, 1 mother and 1 offspring's. Total 5 samples shows type 5 pattern. Type 6 lip print pattern shown by 1 father, 0 mother, 1 offspring's and total 2 samples shows this pattern.

The studies inferred that lip print had yielded varying result for different population. In our population (table no: 1) shows type 1(a clear cut grooves running vertically across the lip) were most predominant. While, Tsuchihashi Y (1974) in his study on Japanese population found that intersected pattern was the most frequent. Vahanwalla and Paeekh (2000) in their study in Mumbai found that type 1(a clear cut groove running vertically across the lip) was most common. Sivapathasundharam et.al., (2001) studied the lip print of Indo-Dravidian population and noted that intersected lip print pattern was predominant. These studies indicate that there exists lot of regional variations among different population.

ASSOCIATION:

This part of the chapter discusses the association between the variables of the study. The data were analysed using the statistical technique. All statistical analysis was done using the statistical package tool for social science (SPSS, version 26).The data obtained was statistically analysed using chi-square test. The range, standard deviation and mean were calculated for each variable such as gender as well as for lip print pattern of father, mother, and offspring. To estimate the lip print inheritance among the family members i.e., lip print pattern of father, lip print pattern of mother, lip print pattern of offspring, chi-square test was utilized.Chi-square test and the results have been interpreted. Using the discussed statistical techniques, the hypotheses developed have been tested and the results have been interpreted along with discussion in following tables.

Chi-square test was done to test whether there is significant relationship between lip print pattern of father and offspring as well as lip print pattern of mother and offspring .A P-value less than 0.05 were considered to be statistically significant , while P-value greater than 0.05 was considered to be statistically not significance.

TABLE NO: 2

CROSS TABULATION BETWEEN LI PRINT PATTERN OF FATHER AND OFFSPRING'S

Father lip print * Offspring's lip print Cross tabulation									
			Offspring's lip print						Total
			type1	type2	type3	type4	type5	type6	
father lip print	type1	Count	6	0	0	0	0	1	7
		% within father lip print	85.7 %	0.0%	0.0%	0.0%	0.0%	14.3 %	100.0 %
	type2	Count	0	1	1	0	0	0	2
		% within father lip print	0.0%	50.0 %	50.0 %	0.0%	0.0%	0.0%	100.0 %
	type3	Count	2	0	7	0	0	0	9
		% within father lip print	22.2 %	0.0%	77.8 %	0.0%	0.0%	0.0%	100.0 %
	type4	Count	3	1	1	3	0	0	8
		% within father lip print	37.5 %	12.5 %	12.5 %	37.5 %	0.0%	0.0%	100.0 %
	type5	Count	2	0	0	0	1	0	3
		% within father lip print	66.7 %	0.0%	0.0%	0.0%	33.3 %	0.0%	100.0 %
	type6	Count	0	0	1	0	0	0	1
		% within father lip print	0.0%	0.0%	100.0 %	0.0%	0.0%	0.0%	100.0 %
Total		Count	13	2	10	3	1	1	30
		% within father lip print	43.3 %	6.7%	33.3 %	10.0 %	3.3%	3.3%	100.0 %

TABLE NO: 2.1

CHI-SQUARE TABLE BETWEEN LIP PRINT PATTERN OF FATHER AND OFFSPRING

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	44.686[a]	25	.009
Likelihood Ratio	40.011	25	.029
Linear-by-Linear Association	1.181	1	.277
N of Valid Cases	30		

Table no 2 illustrates that the cross tabulation between the lip print pattern of father and offspring's. The data shows that total 7 offspring's sample shows type 1 lip print pattern. Out of 7 offspring's samples, 6 samples show similarity with lip print pattern of their father (87.5%). In type 2 lip print pattern, 2 offspring's shows this pattern and only 1 sample shows similarity with their father lip print pattern (50%). In type 3 lip print pattern, 9 offspring's sample shows this pattern. Out of 9 samples, 7 sample shows similarity with their parents (77.8 %). The total 8 offspring's sample shows type 4 lip print pattern and 3 samples show the similarity with their parents (37.5%). The 3 samples shows type 5 lip print pattern and 1 of the offspring's sample shows the similarity with their parents (3.3%). In type 6 lip print pattern, 1 sample show this pattern and no sample similarity with father (0.00%).

The above table (table no: 2.1) illustrates the association between father and offspring's. The result shows that there is significant association between the lip print pattern of father and offspring's. The result shows that there is an association between lip print pattern of father and offspring's, as the P-value is less than 0.05. Hence the null hypothesis has been rejected at 5% level of significance, as P= 0.009. Therefore it is considered that there is significant association between lip print pattern of father and lip print pattern of offspring's.

TABLE NO: 3

CORSSS TABULATION BETWEEN LIP PRINT PATTERN OF MOTHER AND OFFSPRING'S

mother lip print * offspring's lip print Cross tabulation

			Offspring's lip print						Total
			type1	type2	type3	type4	type5	type6	
mother lip print	type 1	Count	6	0	3	1	1	0	11
		% within mother lip print	54.5 %	0.0%	27.3 %	9.1%	9.1%	0.0%	100.0 %
	type 2	Count	3	1	1	1	0	0	6
		% within mother lip print	50.0 %	16.7 %	16.7 %	16.7 %	0.0%	0.0%	100.0 %
	type 3	Count	2	0	1	1	0	0	4
		% within mother lip print	50.0 %	0.0%	25.0 %	25.0 %	0.0%	0.0%	100.0 %
	type 4	Count	2	1	5	0	0	0	8
		% within mother lip print	25.0 %	12.5 %	62.5 %	0.0%	0.0%	0.0%	100.0 %
	type 5	Count	0	0	0	0	0	1	1
		% within mother lip print	0.0%	0.0%	0.0%	0.0%	0.0%	100.0 %	100.0 %
Total		Count	13	2	10	3	1	1	30
		% within mother lip print	43.3 %	6.7%	33.3 %	10.0 %	3.3%	3.3%	100.0 %

TABLE NO: 3.1

CHI- SQUARE TABLE BETWEEN LIP PRINT PATTERN OF MOTHER AND OFFSPRING'S

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	39.733[a]	20	.005
Likelihood Ratio	19.675	20	.478
Linear-by-Linear Association	1.689	1	.194
N of Valid Cases	30		

Table no: 3 illustrates that the cross tabulation between lip print pattern of mother and offspring's. The data shows that total 11 offspring's samples show the type 1 lip print pattern and 6 of them shows similarity with their mother (54.5%). In type 2 lip print pattern, 6 offspring's samples show this pattern and 1 of the sample shows the similarity with their mother (16.7%). The total 4 sample shows the type 3 lip print pattern. Out of 4sample, 1 sample shows the similarity with mother (25.0%). The type 5 (0.00%) and type 6 lip print (0.00) samples do not show any similarity with their mother.

The above table (table no: 3.1) also illustrate the association between mother and offspring's. The result shows that there is significant association between the lip print pattern of mother and offspring's, as the P-value is less than 0.05. Hence the null hypothesis has been rejected at 5% level of significance, as p=0.005. Therefore it is considered that there is significant association between lip print pattern of mother and lip print pattern of offspring's.

Based on above findings from the table, it is inferred that type 1 lip print pattern of sample shows highest similarity with their parents (father 87.5%, mother 54.5%). The results further shows that there is an association between lip print pattern of father and lip print pattern of offspring's. Hence H1 is accepted and H0 is rejected. The findings revealed that the lip print pattern of parents is inherited to their offspring's. Significant association between parents and their offspring's indicating that lip print pattern do have a family lineage.

Hence the accordance with previous studies, our results also provide further evidence to the role of heredity in lip prints. Our study indicates that the lip print patterns shows a marked similarity with parents and can be used for comparison of lip prints within members of the family.

CHAPTER: 5

SUMMARY AND CONCLUSION

The lip prints being uniform throughout the life and characteristics of person can be used to verify the presence or absence of a person from the crime. The pattern of wrinkles on the lips has individual characteristics as fingerprints. The wrinkles and grooves on the labial mucosa (called sulci labiorum) form a characteristic pattern called lip prints. Lip prints may also be used in detection, being a source of criminalistics information. A lip print at the scene of the crime can be a clue to the character of the event, the number, sex, habits and occupation of people involved. It also provides information about the cosmetics used and the pathological changes of lips themselves. Practical use of lip prints in detection work shows that traces of this kind carry a huge amount of precious information which can be used in the reconstruction of an event and identifying suspects. In this study aim to find their any chance of inheritance of lip print pattern from parents to offspring's. Inheritance of lip print pattern help to find out the suspect, by comparing the sample lip print with their parents and database of lip print pattern help to easy identification of suspect.

MAJOR FINDINGS OF THE STUDY:

The key findings of the present study have been presented here;

- There is an association between lip print pattern of father and their offspring's.
- There is an association between lip print pattern of mother and their offspring's.
- There is a common type of lip print pattern among whole samples.

ASSOCIATION:

- There is an significant association between the lip print pattern of father and their offspring's, as the P-value is 0.009 which is less than 0.5. It concluded that there is an inheritance of lip print from father to offspring's.
- There is an significant association between the lip print pattern of mother and their offspring's, as the P-value is 0.005 which is less than 0.5. It concluded that there is an inheritance of lip print pattern from mother to offspring's.
- Type 1 lip print pattern is most common among the whole sample. Out of 90 individual samples, 31 samples shows type 1 lip print pattern.

CONCLUSION:

- Lip prints are inherited to child from their parents.
- Type 1 (A clear cut groove running vertically across the lip) pattern was most common than any other pattern.
- Inheritance between parents and their offspring's indicating that lip print pattern do have a family lineage

LIMITATIONS OF THE STUDY:

- There is a less chance for getting lip print from a scene of crime.
- The samples are only collected from Kollam district.
- Only 3 membered families were selected as samples.
- The sample size is only 30 families; hence a standard significant correlation could not be established.
- Lip prints with disease and deformities are avoided.
- Only consider the age between 10-50

SUGGESTIONS:

Based on the findings of the present study, the following suggestions have been made;

- Increase the sample size can help to give more accurate in result.
- If it is possible, comparison using computerized technology is performed to avoid personal errors.
- Maintaining the database of lip print pattern help in the lip print comparison easily and identification of individuals.

CHAPTER: 6

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CHAPTER: 7

ANNEXURE:

Sample data sheet:

DATA SHEET

TITLE:

Inheritance of lip print pattern among family members

RESPONDENTS:

NAME:

GENDER: male / female

AGE:

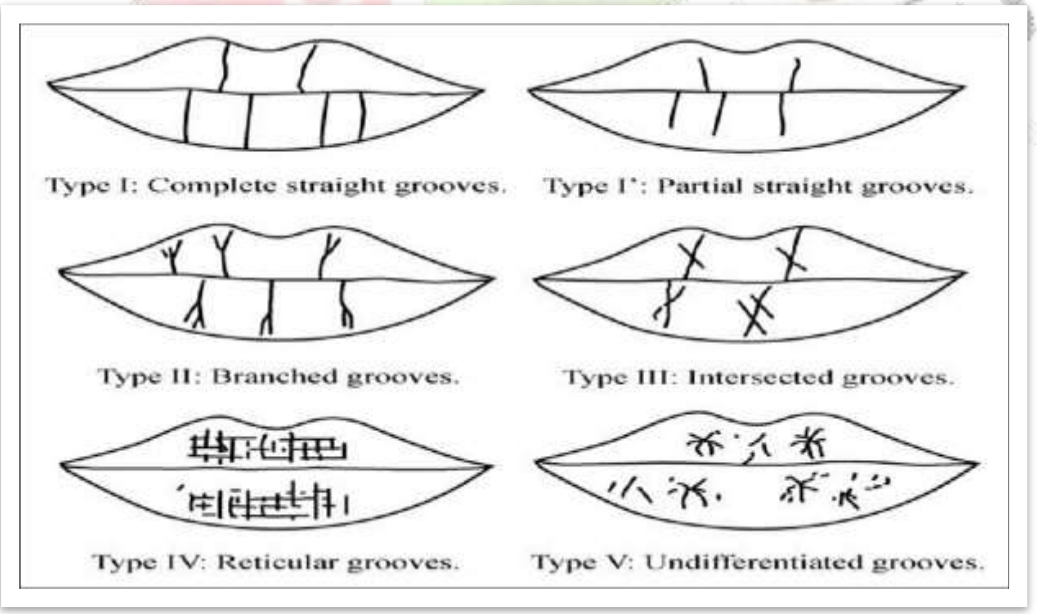
LIP PRINT PATTERN:

Father:

Mother:

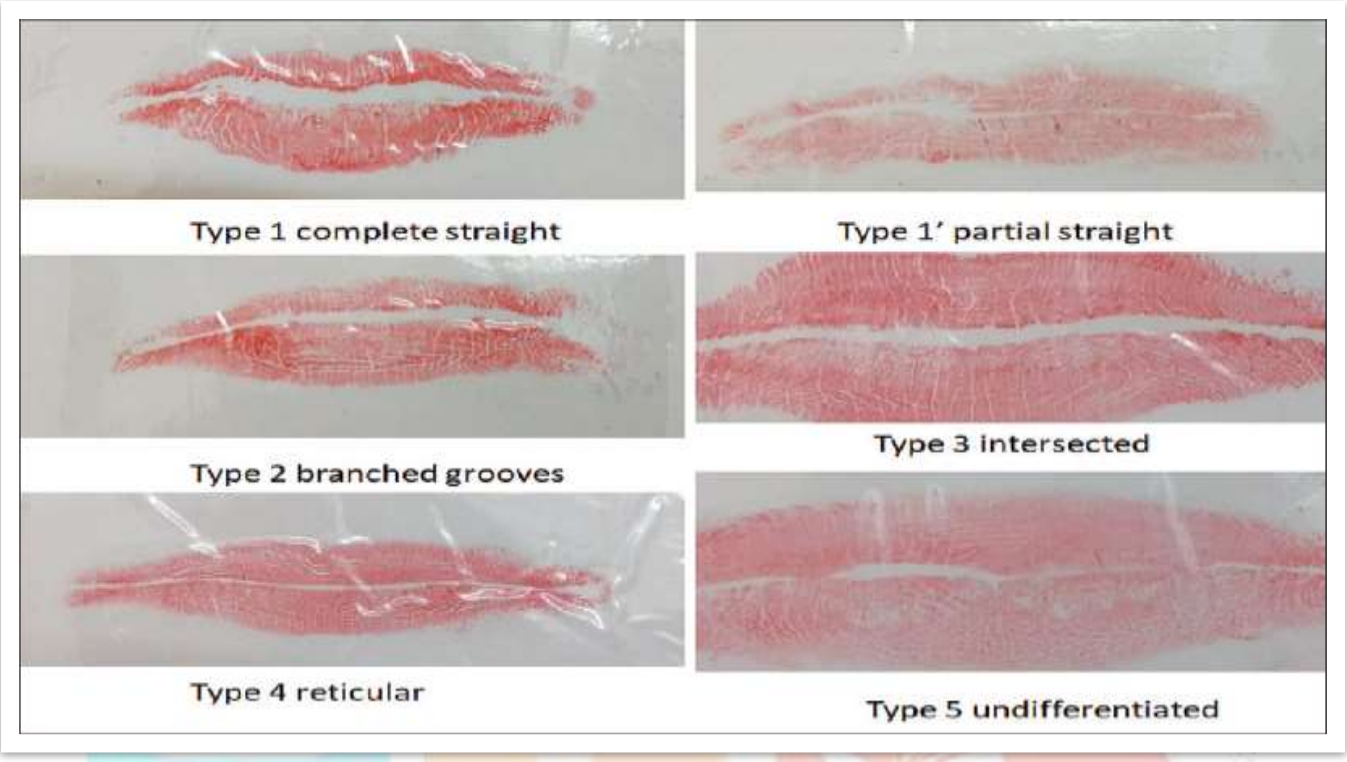
Son /Daughter:

Suzuki and Tsuchihashi classification used for the analysis of lip print pattern



Method of collection of lip print

Lip print patterns



Samples of family that showing similar lip print pattern (branched lip print pattern)