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CHEILOSCOPY – AN AID FOR PERSONAL IDENTIFICATION

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ABSTRACT

Introduction: Cheiloscopy is a forensic investigation technique that deals with identification of humans based on lip traces. The aim of this study was to establish the uniqueness of lip groove pattern, which aids in personal identification. **Materials and methods:** Study group comprised of 500 individuals from Mangalore comprising of 250 males and 250 females of the age group 15-60 years. Materials used were digital camera in a photoshot stabilized tripod stand and cephalostat machine to stabilize the individual. **Results and discussion:** The frequency of lip groove lines in upper and lower lip according to Suzuki and Tsuchihashi classification was different among and within males and females. Hence each and every individual has a unique lip groove pattern. **Conclusion:** A lip groove pattern comprises of different permutations and combinations of lip groove lines in upper and lower lip in each and every individual. It was inferred that frequency of different types of lines according to Suzuki and Tsuchihashi classification in different regions of upper and lower lip were different in each and every individual. Hence, lip groove pattern is unique for an individual and can be considered as a personal identification tool.

Keywords : Cheiloscopy, lip traces, Tsuchihashi.

INTRODUCTION

Forensic science refers to the areas of endeavour that can be used in a judicial setting and accepted by the court and the general scientific community to separate truth from untruth. In forensic identification, the mouth allows for a myriad of possibilities. [1] Due to the distinctive

features of teeth, dental identification is one of the most popular ways to positively identify an individual. In fact, teeth are known to have singular features and possess extraordinary resistance to extreme conditions. These properties enable fast and secure identification processes. [2]

The introduction of fingerprints in the beginning of the past century as the only reliable means of human identification was due to the significant works of three distinguished persons – Sir William Herschel, Sir Francis Galton, and Sir Edward Henry. Fingerprint system was first used in India in 1858 by Sir William Herschel. Awareness of the modern techniques of crime detection has alerted the criminals for taking sufficient precautions like the use of gloves. In such circumstances, the identification of criminals using accurate methods like fingerprint analysis fails to establish a positive identity. The investigators can rely on cheiloscopy as supportive evidence in specific investigations.

Thischeiloscopic study was carried out with the objectives of investigating and evaluating the uniqueness of lip groove patterns, their role in personal identification and for particular lip print pattern identification among Mangalore population.

MATERIALS AND METHODS

After getting the Ethical Clearance certificate from Ethical Committee, Yenepoya Medical College and Hospital, Yenepoya University, Mangalore; the present study was conducted in individuals attending Department of Oral Medicine and Radiology, and among students and staff of Yenepoya University, Mangalore. 500 subjects (250 males and 250 females) were selected for the study after taking their informed consent, based on the following criteria.

Inclusion Criteria

1) Individuals with normal lip profile.
2) Individuals aged between 15 and 60 years.

Exclusion Criteria

1) Individuals with traumatic injuries to lips.
2) Individuals with lesions affecting lips.
3) Individuals with cleft lip or any developmental disturbances affecting the lips.
4) Medically compromised patients.

Selected individual was made to sit in a stabilized chair with back and head well supported in PLANMECA PROMAX Extra Oral Imaging machine, at a fixed point in a plastic sheet laid on the floor in a well-lighted room. Digital camera in a photoshot stabilized tripod stand was placed at a fixed distance from the patient which is marked and an anterior lip profile photograph was made. With this fixed distance as radius, a semi-circle was drawn, over which camera with tripod was moved and right and left lateral lip profile photograph was made at an angle of 45° to the sagittal plane of the subject. (Fig 1:a,b,c)]

Lip groove pattern photograph thus obtained, with the help of Adobe Photoshop (Version C2) was grouped under Suzuki and Tsuchihashi classification.(Fig 2) Both upper and lower lips were divided into three distinct regions each by dropping two perpendiculars from right and left philtrum areas, there by dividing the lips into upper right(UR), upper middle(UM), upper left(UL), lower left(LL), lower middle(LM) and lower right(LR) regions. The numbers of lip groove lines of different type according to Suzuki Classification of lip groove pattern in each region of lips were assessed.

Suzuki and Tsuchihashi Classification: (Fig 3)

Type I - Clear cut grooves running vertically across the lips.

Type I' - Straight grooves which disappear half way instead of covering the entire breadth of the lips.

Type II - Grooves that fork in their course or branched groove or Y shaped groove.

Type III - Intersecting grooves or X shaped groove.

Type IV - Reticular grooves.

Type V - Grooves that donot fall into above categories and cannot be differentiated morphologicaly.

All the data obtained from the subjects were formulated into a master chart (Fig 4) which was subjected to statistical analysis.

RESULTS

All lip groove patterns showed wide diversities. The lip groove pattern did not consist simply of one type of lip groove alone, but appeared as a mixture of varying types. The numbers of different types of lip groove lines in upper lip and lower lip have been unique in each and every individual. A lip groove pattern comprises of different permutations and combinations of lip groove lines in upper and lower lip in each and every individual.It was inferred that frequency of different types of lines according to Suzuki and Tsuchihashi classification in

different regions of upper and lower lip were different in each and every individual. Hence, lip groove pattern is unique for an individual and can be considered as a personal identification tool.

Type I lip groove lines were found to be the predominant variety among both the gender in Mangalore population in all regions of lips except for lower middle region of lips, where in Type I ' lines were found to be more common.

Fig 1. Lip groove pattern photograph being taken.

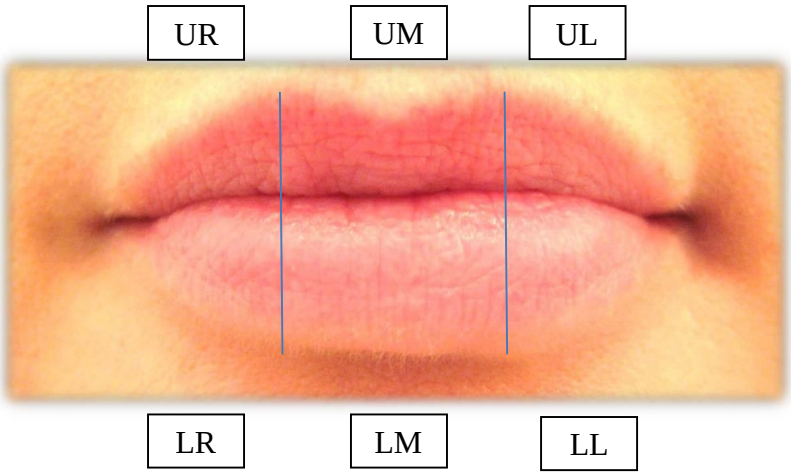


Fig 2. Lip groove pattern photograph divided into six different regions of lips.

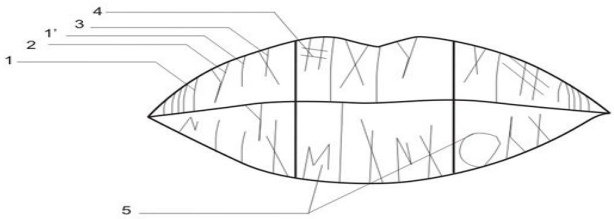
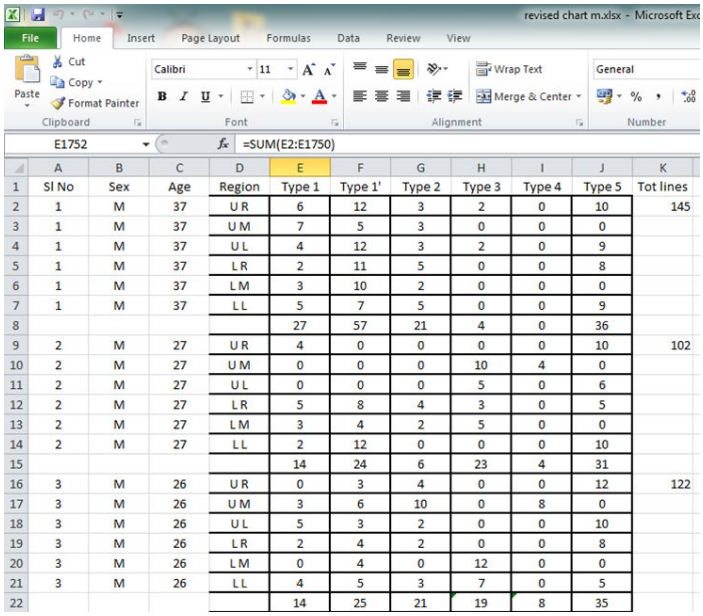


Fig 3. Analysis proforma of lip groove pattern comprising of different types of lip groove lines.



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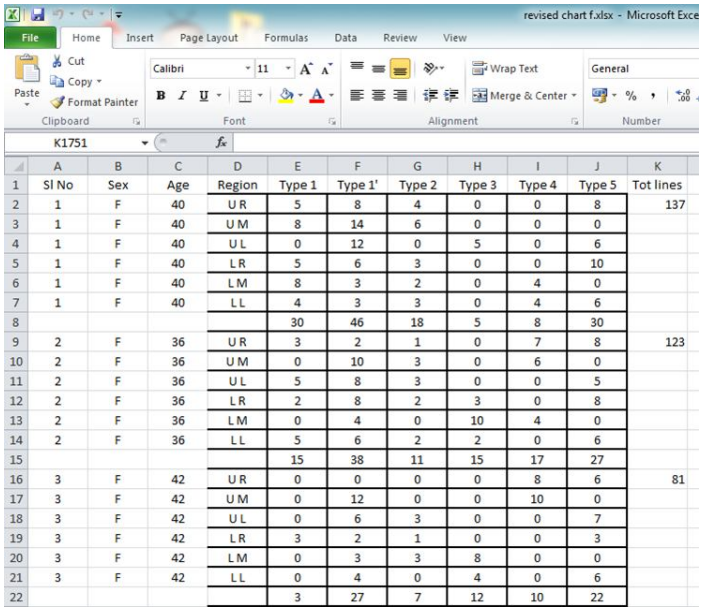
General Number

E1752 =SUM(E2:E1750)

	A	B	C	D	E	F	G	H	I	J	K
1	Sl No	Sex	Age	Region	Type 1	Type 1'	Type 2	Type 3	Type 4	Type 5	Tot lines
2	1	M	37	UR	6	12	3	2	0	10	145
3	1	M	37	UM	7	5	3	0	0	0	
4	1	M	37	UL	4	12	3	2	0	9	
5	1	M	37	LR	2	11	5	0	0	8	
6	1	M	37	LM	3	10	2	0	0	0	
7	1	M	37	LL	5	7	5	0	0	9	
8					27	57	21	4	0	36	
9	2	M	27	UR	4	0	0	0	0	10	102
10	2	M	27	UM	0	0	0	10	4	0	
11	2	M	27	UL	0	0	0	5	0	6	
12	2	M	27	LR	5	8	4	3	0	5	
13	2	M	27	LM	3	4	2	5	0	0	
14	2	M	27	LL	2	12	0	0	0	10	
15					14	24	6	23	4	31	
16	3	M	26	UR	0	3	4	0	0	12	122
17	3	M	26	UM	3	6	10	0	8	0	
18	3	M	26	UL	5	3	2	0	0	10	
19	3	M	26	LR	2	4	2	0	0	8	
20	3	M	26	LM	0	4	0	12	0	0	
21	3	M	26	LL	4	5	3	7	0	5	
22					14	25	21	19	8	35	

Fig: 4 a



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General Number

K1751

	A	B	C	D	E	F	G	H	I	J	K
1	Sl No	Sex	Age	Region	Type 1	Type 1'	Type 2	Type 3	Type 4	Type 5	Tot lines
2	1	F	40	UR	5	8	4	0	0	8	137
3	1	F	40	UM	8	14	6	0	0	0	
4	1	F	40	UL	0	12	0	5	0	6	
5	1	F	40	LR	5	6	3	0	0	10	
6	1	F	40	LM	8	3	2	0	4	0	
7	1	F	40	LL	4	3	3	0	4	6	
8					30	46	18	5	8	30	
9	2	F	36	UR	3	2	1	0	7	8	123
10	2	F	36	UM	0	10	3	0	6	0	
11	2	F	36	UL	5	8	3	0	0	5	
12	2	F	36	LR	2	8	2	3	0	8	
13	2	F	36	LM	0	4	0	10	4	0	
14	2	F	36	LL	5	6	2	2	0	6	
15					15	38	11	15	17	27	
16	3	F	42	UR	0	0	0	0	8	6	81
17	3	F	42	UM	0	12	0	0	10	0	
18	3	F	42	UL	0	6	3	0	0	7	
19	3	F	42	LR	3	2	1	0	0	3	
20	3	F	42	LM	0	3	3	8	0	0	
21	3	F	42	LL	0	4	0	4	0	6	
22					3	27	7	12	10	22	

Fig :4b

Fig 4 (a,b) : Master chart

DISCUSSION

Cheiloscopy for personal identification

In 2009, [3]a study was conducted on lip groove pattern among 100 individuals aged between 18 and 30 years, comprising of 50 males and 50 females using a dark coloured lipstick and impression method, it was found that no individual had single type of lip groove pattern in all the four compartments and no two or more individuals had similar type of lip groove pattern, which was in accordance with the results of present study. In 2011 [4] a study on lip groove

patterns was conducted among 100 students studying in a private coaching institute, 50 males and 50 females, in the age group of 20 to 30 years. These lip groove patterns were studied and classified according to Suzuki and Tsuchihashi's classification. Results showed that no two lip groove patterns matched with each other, which again was in accordance with present study.

Cheiloscopy and its uniqueness

According to a cheiloscopic study conducted in 2009[5]on lip groove pattern among 50 males and 50 females of age group 25-40 years from Kerala, it was observed that Type IV lip groove lines were most frequently observed in both gender and in both the quadrants. In a lip groove pattern study among Mumbai population, Type I lip groove lines were most frequent, which was in accordance with the results of the present study. In a study of lip groove pattern of Indo-Dravidan population, Type III lip groove lines were predominant. In a comparative study between Indian and Chinese population, incidence of Type II lip groove lines were found to be highest among Indians. These studies reveal that lip groove patterns showed racial differences which can be a useful adjunct in identification of an individual, which was in accordance with the results of the present study.

Hence, it has to be inferred that specific type of lip groove lines according to Suzuki and Tsuchihashi classification has its geographic predilection. Type I lip groove lines were found to be the predominant lip groove type among both genders in Mangalore population in all regions of lips except for lower philtrum region of lips. The uniqueness of lip groove pattern among Mangalore population was also proven beyond doubt according to the results of the present study.

CONCLUSION

Human identification is the mainstay of civilization, and the identification of unknown individual has always been of paramount importance to society. Finger prints, post mortem reports and of late, DNA finger printing has been successful in personal identification in the field of forensic science. Lip groove patterns are unique and do not change during the life of a person. Lip groove patterns just like the finger prints if get registered at the vicinity of a crime can often be retained on the object. Studies show that cheiloscopy can be instrumental in identifying a person positively and can be used to verify the presence or absence of a person at the scene of crime. With the current status of cheiloscopy in mind, this study was

conducted to assess and establish the accuracy and usefulness of lip groove patterns in personal identification.

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