Correlation of Lip Print, Finger Print and Blood Groups in a Tamil Nadu Based Population.

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Abstract:

Aim :
The aim of the study is to analyse the predominant lip print pattern, finger print pattern and ABO blood group in the study population and see if there is any correlation among them that might help in personal identification.

Method :
Lip print pattern, finger print pattern and ABO blood groups of 150 individuals(males and females) in the age group of 15-40 years will be collected and compared.

Background:
Identification plays a major role in any crime investigation. Lip prints and finger prints are tools employed in identifying an individual. The pattern of wrinkles on the lips has individual characteristics like fingerprints. The various lip print patterns are reticular, vertical pattern, intersected pattern, branched pattern, partial vertical pattern. The various finger print patterns are loop ,whorl, arch, and other pattern. These two in combination might help in identification of an individual. They might be a simple yet useful tool compared to sophisticated molecular techniques.

Reason:
The correlation between fingerprints, lip prints and blood group ,if any, might help in identification of an individual.

Keywords:
Cheiloscopy, ABO blood groups, finger print, forensic identification.

INTRODUCTION:

Every person has certain features that makes them radically distinct from other[1]. With the ever-increasing demands placed upon law enforcement to provide sufficient physical evidence linking a perpetrator to crime, it makes sense to utilise any type of physical characteristics to identify a suspect of an offence[2]. "IDENTITY" is a set of physical characteristics, functional and psychicnormal or pathological, that defines an individual. Individual identification is a crusial and an exigent task in forensic investigation and in forensic science[3]. Forensic science refers to the areas of endeavor that can be used in a judicial setting and accepted by the court and the general scientific community to separate truth from untruth[4]. Some methods of personal identification include anthropometry, dactyloscopy, palatal rugae pattern dna fingerprinting, sex determination, estimation of age, measurement of height, post-mortem reports, differentiation of blood groups, hand writing and bite marks[5,6,7].

Finger print is an impression of the curved lines of the skin at the end of a finger that is left on a surface or made by pressing an inked finger onto paper. These are epidermal ridges differentiated in their derivative forms during the 3rd or 4th month of foetal life. These remain unchanged from birth till death[5].

Like finger prints, lip prints have also been recognised and accepted as standard for personal identification worldwide[8]. Labial mucosa, a part of the oral mucosa is not smooth like the buccal mucosa or soft palate. It has many elevations and depressions forming a characteristic pattern called lip print[9]. In forensics , the mouth allows a myriad of possibilities[10]. Traces from the scene may be carried away on the person and at the same time may be left at the scene. Lip print is one of the evidence that can be left in the crime scene by which it helps in identification of an individual[11]. The study of these grooves and furrows present on the red part or the vermilion border of the human lips is known as cheiloscopy, which is important for forensic identification[12]. This phenomenon was first noted in countries like Poland and USA[12]. Yasuo tsuchichashi, classified lip prints into six classes according to the shape and course of the grooves[13,14]. Just like finger prints, lip prints are also permanent identification record.

Yet another biological record that remains unchanged throughout the life time of a person is the blood group. Determining the blood group of a person from the samples obtained at the site of crime, helps identify a person. Landsteiner classified blood groups under the ABO blood group system[3].

The use of lip prints and finger prints is of paramount importance , since doing a personal identification by other means such as DNA analysis is sophisticated and they are not available in rural and developing countries[3].

The present study is done to determine if there is any correlation between lip print pattern, finger print pattern and blood group, which can be used in forensic identification of an individual.

MATERIALS AND METHODS:

Sample selection:

The present study was conducted to determine if there is any correlation between lip print patterns, finger print patterns and blood groups, which can be used for forensic identification. A total of 158 students aged between 14 to 25 from Saveetha University, Chennai participated in the study. Among the 158 students, 83 were male participants and 75 were female participants. The study was approved by the institutional review board.

Inclusion criteria:

Subjects willing to participate between the age group 14 to 25, subjects free from any scar or lesion on the lips , subjects free from cuts, lesion on the thumb(right), were included in this study.

Exclusion criteria:

Subjects with deformities of lips like cleft lip, ulcers, traumatic injury on lips, allergy to the lipstick used, subjects with cuts and lesions on the finger, were excluded from the study.

Methodology:

The labial mucosa was first cleaned. Using an ear bud, the lipstick was applied on the subject. With a cellophane tape, the lip print of the subject was recorded on A4 sheets. The subject was then asked to place his right thumb over the stamp pad, and the finger print was recorded on the A4 sheet . The blood group of the individual was noted down by questioning and in case of people who were unaware, tests were done to determine their blood group. Immediately after recording, the lip prints and finger prints were examined on first look. If the print was not satisfactory another print was obtained from the same individual.

Once the collection of data was completed, the lip prints and finger prints were interpreted. Each lip print was divided into 6 parts, in which the central portion was focussed using a magnifying glass. The lip print was studied according to the classification given by Suzuki and Tsuchihashi(1971)[1]

Type - I	Clear cut grooves running vertically across the lip
Type - I'	The grooves are straight but they disappear halfway
Type - II	The grooves fork in their way(branched)
Type - III	The grooves intersect(intersecting)
Type - IV	The grooves are reticular(reticular)
Type - V	The grooves do not fall in any of the types from i to iv(undetermined)

Finger prints were also studied using magnifying glass, and classified base on Michael and Kucken's finger print classification,[7]

- Arch
- Loop
- Whorl
- Composite containing two or more forms

The results were tabulated in MS excel and the statistics were using SPSS software.(version 20.0)

Fig-1- vertical lip print

Fig-2-reticular lip print

Fig -3- branched lip print

Fig-4- intersecting lip print

Fig-5- double loop

Fig-6- plain loop

Fig-7- whorl

RESULTS:

The present study was conducted to determine if there is any correlation between lip print patterns, finger print patterns and blood groups. The samples were collected from 158 individual which included 83 male and 75 female participants. The samples were examined and the results obtained are as follows;

Among 158 individuals, branched lip print was observed in 39.9% (63)individuals, reticular lip print 19.6%(31), intersecting lip print 17.7%(28), vertical lip prints 13.9%(22), undetermined lip print 8.9 %(14).
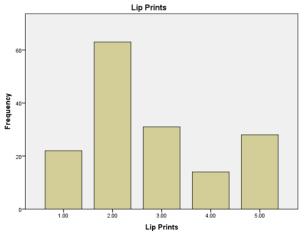
Among 158 individuals the percentage distribution of plain loop was observed in 42.4%(67) individuals, double loop is 26.6%(42),whorl finger print is 26.6%(39), plain arch is 6.3%(10).

Among 158 individuals, the percentage distribution of various blood groups is as follows. O positive blood group was seen in 41.8%(66) individuals, b positive in 27.8%(44) individulas, a positive in 16.5%(26) individuals,ab positive in 7.6%(12) individuals, ab negative in 2.5%(4) individuals, b negative in 1.90%(3) individuals, o negative in 1.3%(2) individuals, a negative in 0.6%(1) individual.
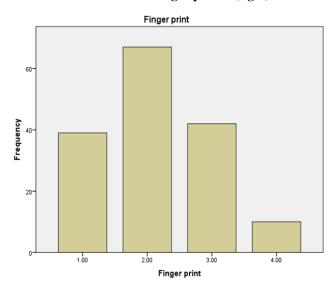
STATISTICS: (table 1)

	Lip print	Finger print	Blood group
Valid N	158	158	158
Missing	0	0	0

FREQUENCY TABLE :(table 2)

Lip prints:

	Frequency	Percent	Valid percent	Cumulative percent
1. Vertical	22	13.9	13.9	13.9
2. Branched	63	39.9	39.9	53.8
3. Reticular	31	19.6	19.6	73.4
4.Undetermined	14	8.9	8.9	82.3
5.Intersecting	28	17.7	17.7	100.0
TOTAL	158	100.0	100.0	

FINGER PRINT:(table 3):

	Frequency	Percent	Valid percent	Cumulative percent
1.Whorl	39	24.7	24.7	24.7
2.Plian loop	67	42.4	42.4	67.1
3.Double loop	42	26.6	26.6	93.7
4.Plain arch	10	6.3	6.3	100.0
TOTAL	158	100.0	100.0	

BLOOD GROUP:(table 4)

	Frequency	Percent	Valid percent	Cumulative percent
1. O +ve	66	41.8	41.8	41.8
2. O -ve	2	1.3	1.3	43.0
3.A +ve	26	16.5	16.5	59.5
4. A -ve	1	0.6	0.6	60.1
5.B +ve	44	27.8	27.8	88.0
6. B -ve	3	1.9	1.9	89.9
7.AB +ve	12	7.7	7.7	97.5
8. AB -ve	4	2.5	2.5	100.0
TOTAL	158	100.0	100.0	

BAR CHART:
Distribution of lip prints: (fig-8)

Distribution of finger prints: (fig-9)

ANOVA:(Table 5):

		Sum of squares	Df	Mean square	F	Sig
Lip Prints	Between groups	27.587	8	3.448	2.134	0.036
	Within groups	240.748	149	1.616		
	Total	268.335	157			
Finger Prints	Between groups	4.443	8	0.555	0.731	0.664
	Within groups	113.209	149	0.760		
	Total	117.652	157			
Blood Groups	Between groups	25.926	8	3.241	0.662	0.724
	Within groups	729.593	149	4.897		
	Total	755.519	157			

Table 5: Comparison of results using ANOVA revealed no statistically significant difference between the groups.

The distribution of lip print patterns, finger print patterns, and blood groups among males and females are tabulated in table 6

Table 6:

	Males	Females	Total
LIP PRINT PATTERN			
Branched	43	20	63
Intersecting	12	16	28
Reticular	14	17	31
Undetermined	7	7	14
Vertical	7	15	22
TOTAL	**83**	**75**	**158**
FINGER PRINT PATTERNS			
Double Loop	20	22	42
Plain Arch	5	5	10
Plain Loop	38	29	67
Whorl	20	19	39
TOTAL	**83**	**75**	**158**
BLOOD GROUPS			
O +ve	37	29	66
O -ve	0	2	2
A +ve	9	17	26
A -ve	1	0	1
B +ve	26	18	44
B - ve	2	1`	3
AB +ve	4	8	12
AB -ve	4	0	4
TOTAL	**83**	**75**	**158**

DISCUSSION:

There are a few traits that identify an individual. These range from precise molecular DNA typing to macroscopic structures like finger prints and lip prints. For a physical characteristic to be used as an identification marker, it should be unique and permanent. Finger prints, lip prints and blood groups are biological characteristics that are persistent from birth to death of an individual. The present study was an attempt to determine if there was any correlation between lip print, finger print and blood groups among the individuals in a Tamilnadu based population.

In the present study, the distribution of branched lip prints in both the sexes was more prevalent, This result is distinct from those previously reported where in reticular[13] and intersecting were [12,13] the predominant lip print type. These variations may be attributed to ethnic and racial variation in lip prints[7].

Among the finger print patterns, plain looped pattern was more prevalent. This is in accordance to the previous studies[5,15-20]. In any population plain loop is the most common finger print pattern followed by loop. This finding was observed in the present study. Therefore , it is understandable that though there exists a variation in the lip print patterns among populations, the finger print patterns form a common trend of occurrence.

Blood groups are biological records that remain unchanged throughout the life time of an individual. O +ve blood group was the most commonly observed blood group in the present study, followed by B+ve blood group.

Individuals with A+ve and AB+ve blood group had more of branching pattern, while those of A-ve blood group and AB-ve predominantly had an intersecting pattern. Here the rh factor along with the A antigen seems to have a correlation with the lip print. However future studies are needed to confirm this finding.

In comparison to studies conducted earlier, reticular type of lip print was more prominent in subjects with B +ve blood group, and vertical lip prints in subjects with O +ve blood group[3].

Similarly, double loop was the most common finger print pattern in subjects with A+ve and AB+ve blood group. Plain loop was more in subjects with O +ve and B+ve blood groups. O+ve is also the most commonly occurring blood group in the study population, since both these variables occur frequently in the population, the combination of loop finger print pattern and O+ve blood group happened to be predominant in the present study. The same can also justify the occurrence of loop finger print in people with B+ve blood groups. These results are also in accordance with previous study[3] wherein loop was the most commonly occurring finger print pattern in O +ve and B+ve blood groups.

CONCLUSION:

On comparing the three parameters together, it was evident that though there was a pattern of clustering the results were not statistically significant. Apart from forensic identification, finger print patterns can also predict susceptibility to diseases. Lip prints can also be used along with finger prints to study genetic susceptibility to diseases.

REFERENCES:

[1] Bushra karim, devanand gupta. *Cheiloscopy and blood groups: aid in forensic identification*, the saudi dental journal, oct 2014, vol 26, issue 4, pages 176-180.

[2] L Vamsi krishna reddy, *lip print:an overview in forensic dentistry*, journal of advanced oral research, 2011, vol 2, issue 1, pages 1-94

[3]. Srilekha n, anuradha a, vijay srinivas g, sabitha devi r, *correlation among lip prints pattern, finger print pattern and abo blood group*, journal of clinical and diagnostic research, mar 2014, vol 8, issue 3, pages 49-51.

[4.] Sheetal p mhaske, kiran jagtap, rashmi deshpande,*cheiloscopy- tool for forensic identification*, ijdpms,may-aug 2013, vol 1, issue 3.

[5]. Dennis e.o eboh, *finger print patterns in relation to gender and blood groups among students of delta state university, nigeria*, jecej journals, 2013, vol 12, issue 2, pages 82-86.

[6]. Puneet kumar, roshni dupare, prince kumar, vineet gupta. *Role of lip print as a novel tool in personal identification*: an overview,srm j res dent sci 2013, vol 4, issue 1, pages 21-24.

[7]. M. Murugan, t. Karikalan. *A study of relative correlation between the pattern of finger prints and lip prints.* Journal of evolution of medical and dental sciences 2014; vol3, issue 56, oct 27, pages 12768-12772, doi: 10.14260/jemds/2014/3694.

[8]. Amith hv, anil v ankola, nagesh l. *Lip prints- can it aid in individual identification*, journal of oral health and community dentistry, sep 2011, vol5, issue 3.

[9]. Telagi n, mujib a, spoorthi b r, naik r.*cheiloscopy and its pattern in comparison with abo blood groups*. J forensic dent sci 2011,vol 3, issue 2, pages 77-80.

[10]. Pradhuman verma, suresh k sachdeva, kanika gupta verma, swati suharan, kompal sachdeva. *Correlation of lip print with gender, abo blood groups and intercommissural distance*, north america journal of medical sciences 2013, july, vol5, issue 7, pages 427-431.

[11]. Karki rk. *Lip prints- an identification aid.* Kathmandu univ med j 2012; vol 38, issue 2, pages 55-57.

[12]. Dr. Annie j. Verghese, dr. M somasekar, dr. Umesh babu r. *A study on lip print types among the people of kerala,* j indian acad forensic med, 32(1).

[13]. Annie j verghese, shashidhar c mestri. *A study of efficiency of lip prints as an identification tool among the people of karnataka in india,* j indian acad forensic med. July- sep 2011, vol 33, issue 3.

[14]. Adamu lh, taura mg, hammam wo, ojo sa, dahiru au, sadeeq aa, ibrahim ad,. *Association of lip print and sex among nigerians.* Niger j basic clin sci 2012, vol 9, issue 2, pages 79-83.

[15]. Bharadwaj a, saraswat b, aggarwal s.k, banerji p, bharadwaj s,(2004). *Pattern of finger prints different abo blood groups.* J indian acad forensic med 26(1);6-9.

[16]. Gowda m.s, rao c.p(1996). *A study to evaluate relationship between dermatoglyphic features and blood groups.* J anat soc india 45;39.

[17]. Herch m.(1932). Papillarmuster bei engeotorenen der loyalty inschm, berichungan swischen papillarmuster and bluntgrainppen beidiessen an liner dentschem verglei chsgrmppe ztschr f rasseh physio 5: 163-8

[18]. Kshirsagar s.v, burgul s.n, kamkhedkar., maharastra a(2003). *Study of finger print patterns in abo blood groups.* J anat soc indian 52(1):82-115

[19]. Mhahjan a.a(1986). *Dermatoglphics and abo blood group.* Thesis submitted for m.s anatomy, aurangabad.

[20]. Mehta a.a, mehta a.a(2011). *Palmar dermatoglyphis in abo, rh blood groups.* Int j bio med res 2(4):961-4.