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RESEARCH ARTICLE

LIP PRINTS-AN ADJUNCT TO SEX DETERMINATION IN CHILDREN IN 12-14 YEAR OLD CHILDREN

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ABSTRACT

Aim: The aim of this study was to determine the efficacy of lip prints for sex determination in children in 12-14 years of age**.**

Materials and Methods: This study was conducted on 100 subjects, which included 50 males and 50 females, in the age group of 12-14 years from various schools in Patiala. After applying lip stick evenly, the lip-print of each subject was obtained on a simple bond paper. The lip-print was then analyzed and interpreted to determine the sex of individuals.

Results: We found that out of 50 male children 32 were correctly interpreted as males, 15 were incorrect and 3 were undetermined. Of 50 females, 36 were accurately interpreted, while 12 were misinterpreted as males and 2 went undetermined. Type I was the most commonly occurring trend in females whereas Type IV was the most commonly occurring trend in male children seen in Patiala.

Conclusion: Along with other traditional methods, cheiloscopy can also serve as very important tool in the identification of a person based on the characteristic arrangement of lines appearing on the lips.

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INTRODUCTION

Every person is born with certain bodily features that make him unique and one of a kind. For a long time forensics have been using fingerprints, DNA and retina pattern for identification of a person. Human identification from the study of their biometrics has gained much popularity in recent times. In these approaches human beings can be identified based on their physical traits without the aid of any external key. Yasuo Tsuchihashi and Kazuo Suzuki at Tokyo University from 1968-1971 confirmed that humans may have unique lip features in general. These examinations helped scientists for recognition of human based on lip prints. "Cheiloscopy" derived from the Greek word chelio- lips and skopein- seen is the name given to the study of lip prints. This biological feature was first described by Fischer in 1902; however it was only in 1930, that Diou de France's developed some studies which led to lip print use in criminology. In 1932, Edmond Locard, one of the France's greatest criminologists, acknowledged the importance of cheiloscopy. In 1950, Le Moyer Snyder, in his book "Homicide Investigation", mentioned the possibility of using lip prints in the matter of human identification. Lip prints are unique and do not change during the life of a person. It has been verified that lip prints recover after undergoing alterations like minor trauma, inflammation and diseases like herpes. The form of the furrows does not vary with environmental factors. However, major trauma to the lips may lead to scarring, pathosis and the surgical treatment rendered to correct the pathosis may affect the size and shape of the lip, thereby, altering the pattern and morphology of grooves. The lip prints of parents and children and those of siblings have shown some similarities. It has also been suggested that variations in patterns among males and females could help in sex determination. Criminals may conceal their sex to avoid detection by changing dress or by other methods. This can be detected by physical examination

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MATERIALS AND METHODS

Selection of children

For the purpose of this study, 100 children aged between 12 to 14 years (50 males and 50 females) were selected from Government School, Patiala. Written consent was obtained from parents or caregivers for child's participation in the study. Care was taken to select individuals having no lesion, whether active or passive on the lips. Individuals with known hypersensitivity to lip stick were not included in the study.

MATERIALS

1. A dark coloured lipstick
2. Cotton Applicator
3. Thin bond paper
4. Cellophane tape
5. Magnifying lens
6. Pen/ pencil for labelling the individual details

METHODS

The dark coloured lipstick was applied with cotton applicator in a single stroke, evenly on the vermilion border. The subject was then asked to rub both the lips to spread the applied lipstick evenly. The set of lip-imprints were then obtained on a simple bond paper and they were coded based on the name and the sex of the individuals for both males and females separately. All the lip-prints were compiled, analyzed and interpreted. Lip prints were classified using the classification proposed by Suzuki K. and Tsuchihashi Y. in 1970 also known as Tsuchihashi's classification. They classified the natural lip marks/fissures in four types as follows:

Table 1. Classification of Lip prints by Tsuchihashi's

Type I:	Vertical, comprising of complete (end to end) longitudinal fissures/patterns.
Type I':	Incomplete longitudinal fissures
Type II:	Branching Y shaped pattern.
Type III:	Criss-cross pattern
Type IV:	Reticular, typical chequered pattern, fence like.
Type V	Undetermined

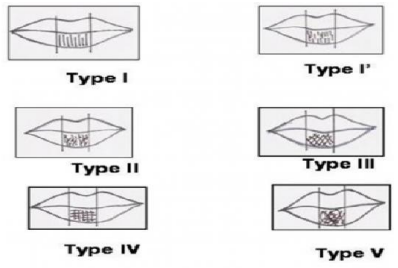

Figure 1

This is the most widely used classification used in literature. It was found to have a clear description of nearly all of the commonly encountered lip patterns and was easy to interpret.
The sex of the individual was determined as per the descriptions given by Vahanwala *et al*.(2006)

Type I & I' pattern dominant : Female
Type II pattern dominant : Female
Type III pattern dominant : Male
Type IV pattern dominant : Male

All the lip prints obtained were studied and interpreted to identify the sex of the subjects and results were analyzed for the presence or absence of common lip print patterns in males and females.

RESULTS

After the interpretation of sex, as per Vahanwala-Parekh *et al*, it was found that out of 50 male children 32 were correctly interpreted and 15 were incorrectly interpreted while 3 were undetermined. Also Figure 2 shows that out of 50 female children 36 were correctly interpreted and 12 were incorrectly interpreted while 2 were undetermined as either males or females. Figure 3 shows that the most predominant pattern in the entire study population was Type I in 26 %. This was followed, in order, by Type I' (22%), Type II (18%), Type V (17%), Type III (8%). In males, Type IV and Type V (24%) lip pattern was predominantly reported whereas Type I (26%) lip pattern was commonly found in females. The least observed lip pattern in both males and females was found to be Type III (8%).

Table 2. Representing the number of children correctly and incorrectly interpreted and undetermined

	Males	Females	Total
Correctly interpreted	32	36	68
Incorrectly interpreted	15	12	27
undetermined	3	2	5

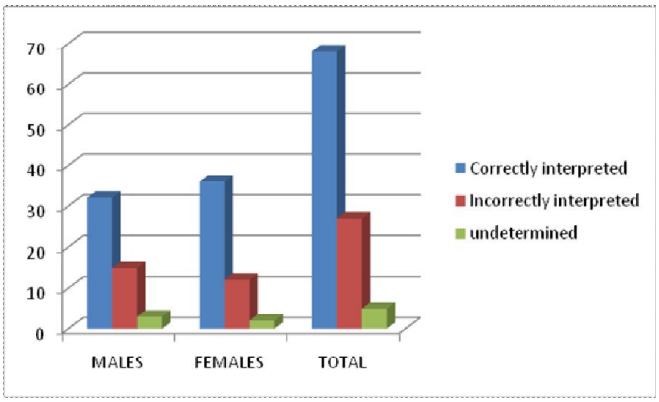

Figure 2. The number of children correctly and incorrectly interpreted and undetermined

Table 3. Distribution of type of lip pattern in the study population

Lip print pattern	Males	Females	Total
Type I	8	18	26
Type I'	4	8	12
Type II	11	7	18
Type III	3	5	8
Type IV	12	5	17
Type V	12	6	18

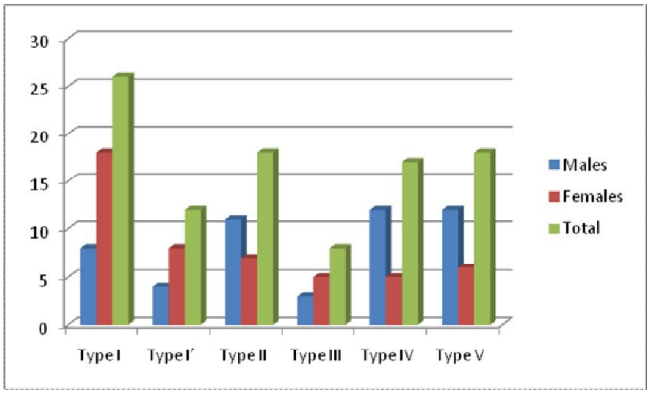

Figure 3. Distribution of type of lip pattern in the study population

DISCUSSION

Personal identification is necessary for unknown deceased person in homicide, suicide, accident, mass disaster, etc., and for living individual who are missing or culprits hiding their identity. If a definite description of the different parts of the upper lip and the lower lip are established for an individual by detailed study, this anti-mortem record can be used for matching the details of lip prints in postmortem records for personal identification. Lip pattern is unique for each of the examined individuals, even in twins and family relatives. This finding is hoped to be useful in the identification process, both in civil and criminal issues. The positive identification of living or deceased persons using the unique traits and characteristics of the teeth and jaws is a corner stone of forensic science. A series of forensic odontological studies on the morphology of the lips and the pattern produced when they are impressed onto a variety of surfaces forms a worthy additional weapon for personal identification. The red part of the lips together with an individual structure of lines may constitute a source of circumstantial evidence. In the present study, we aimed to find out the variations in lip patterns of 100 children of 12-14 years which comprised of 50 males and 50 females. We tried to ascertain whether the lip prints hold the potential for determination of sex and identity of the individual. Even though the lines and furrows are present, both in upper and lower lip from one corner of mouth to other corner, only the middle portion of the lip is taken into account, since this portion is always visible in any trace. We labelled a particular pattern on the basis of the maximum number of types of lines present that is vertical, intersected, branched or reticular. If more than one pattern predominates it is typed as undetermined. In the past some researchers have worked on lip prints to prove that the gender difference does exist in lip print. According to Vahanwala *et al*. 2006. Type I and Type I' patterns were found to be dominant in females while type III, IV and V were dominant in males. In another study by Vahanwala and Parekh, it was shown that all four quadrants with the same type of lip prints were predominantly seen in female subjects and male subjects showed the presence of different pattern in a single individual. Also similar results were seen in the study conducted by Gondivkar *et al*. who studied 140 individuals with 70 males and 70 females. The found out that 67 of the actual 70 lip-prints of females were correctly identified and 65 of the 70 males were correctly diagnosed as males. Type C (47.14%) was the most commonly occurring trend in females whereas Type B (70%) was the most commonly occurring trend in males. Evidences such as photographs, cigarette butts, drinking glasses, cups, letters, window panes and other items that could bear lip prints should be closely examined. A trace of this kind carries a huge amount of information which can be used in the reconstruction of the events, establishing versions, checking them and identifying suspects. A lip print at the scene of crime can be basis for conclusion as to the character of the event, the number and sex of the people involved, cosmetics used, habits, occupational trials and the pathological changes of the lips themselves. The classification and observation of patterns in the population have resulted in some useful data.

Conclusion

Despite the fact that identification of an individual by lip prints appears to be accepted in some places, this procedure requires further studies with larger sample size. The uniqueness of lip prints need to be confirmed and accepted. A standard and uniform procedure has to be developed for the collection, development and recording of lip prints and the ensuing comparison. Until then identification by lip prints will only act as an supplemental tool along with procedures giving more accurate results.

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