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RESEARCH ARTICLE

ASSOCIATION OF LIP PRINTS AND PALATAL RUGAE WITH BIRTH MONTH

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ABSTRACT

Context Establishing a person’s identity can be a very difficult process. Dental records, finger prints and DNA comparisons are probably the most common techniques used in this context, allowing fast and secure identification processes. However, since they cannot always be used, sometimes it is necessary to apply different and less known techniques. Lip prints and palatal rugae can be considered as a source of comparative material, because because of their accuracy in legitimizing an identification process even in extreme circumstances.

Aims To correlate lip prints, palatal rugae with birth month

Methods and Material Study comprised of 360 samples. Lip prints were recorded in half of 360 samples and in the other half of the sample palatal rugae were recorded. Both the records were analysed

Statistical analysis used Chi square test was applied for statistical analysis

Results Statistical tests revealed significant association of few types of lip prints, palatal rugae with birth month

Conclusions Significant association of lip prints and palatal rugae with birth month was obtained. Hence, it can be used as an adjunct information

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INTRODUCTION

Personal identification forms an integral part of forensic science. There are several methods for identification such as fingerprints, DNA profiling, bitemarks, radiographs, photographs, molecular methods ⁽¹⁾. In some circumstances unusual techniques like cheiloscropy and rugoscropy help in identification. Study of lip prints is known as cheiloscropy. Lip prints are present in the zone of transition of human lip, between the inner labial mucosa and skin as wrinkles or grooves ⁽²⁾. Lip prints are exclusive for each individual and are considered as positive means of identification according to The Federal Bureau of investigation (F.B.I) and the Illinois state police ⁽³⁾.

Palatal rugae are asymmetric ridges on the palate that lie between incisive papilla and median palatal raphe ⁽⁴⁾. Study of which is known as rugoscropy. They appear in third month of embryoic period, being unique and persist throughout life. ⁽⁵⁾ Hence, both lip prints and palatal rugae patterns are said to be adjunctive tools in forensic investigation. There is sufficient literature available on cheiloscropy and rugoscropy usage for sex determination ^(1, 2, 4).

Through this study we tried to elicit if any association of lip prints and palatal rugae with birth month exists. Aim of the study was to evaluate if any potential association exists

between lip prints and birth month also between palatal rugae and birth month.

METHODS

The study population comprised of 360 students in an age range of 17- 25 years. Half of the sample sizes were considered for lip print analysis and the other half for palatal rugae analysis. Birth month of all the participants were noted priorly. For lip prints, a dark colored lipstick was applied uniformly on the lips. A transparent cellophane strip was used to record lip prints and was then stuck on to a paper, for permanent record (Figure 1).



Figure 1 Lip print patterns

Lip prints were analysed using magnifying lens and classified according to the classification proposed by Tsuchihashi ^(6, 7) (Table 1). For classifying the lip prints, lower lip middle

portion was considered, as proposed by Sivapathasundaram *et al*⁽⁴⁾ irrespective of the impression made the accuracy of the middle portion remains virgin is considered as one of the can be recorded in a non technique sensitive procedure is almost always visible in any trace. To record palatal rugae, alginate impression of the maxillary arch was made using metallic impression trays.

Table1 Classification of Lip Prints (Depending on Groove Patterns)

Type 1	Clear-cut vertical grooves that run across the entire lips (vertical complete)
Type 1'	Similar to type 1, but do not cover the entire lip (vertical incomplete)
Type 2	Branched grooves
Type 3	Intersected grooves
Type 4	Reticular grooves
Type 5	Grooves that cannot be differentiated morphologically

Permanent/ secondary impression was made using dental stone. On the secondary cast outline of the rugae were delineated with the help of graphite pencil. (Figure 2) Analysis of palatal rugae was done using magnifying lens and classified according to Lysell⁽⁸⁾ (Table 2)

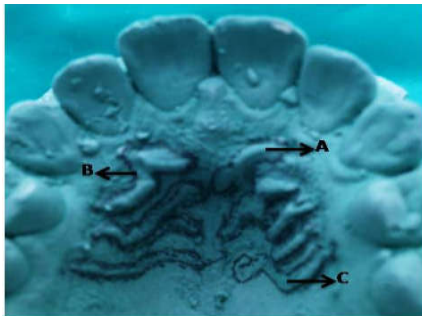


Figure 2 Tracing of palatal rugae
a) Straight b) Curved c) Wavy

Table 2 Classification of palatal rugae (According to shape)

Curved	They had a crescent shape and curved gently. Evidence of even the slightest bend at the origin or termination of a ruga led to it being classified as a Curved ruga.
Wavy	If there was a slight curve at the origin or termination of a curved ruga, it was classified as wavy
Straight	They run directly from their origin to Termination.
Circular	Rugae that formed a definite continuous ring

Statistical analysis was carried out using chi-square test. 'P' value < 0.005 was considered significant. (Table 3)

Table 3 Statistics

	Value	Df (degree of freedom)	Asymp. Sig. (2-sided)
Chi-Square	118.354	55	<0.001
N of Valid Cases	180		

RESULTS

In the present study we could find that vertical complete and incomplete type of lip patterns were seen predominantly in the people having May as birth month. Intersecting type of pattern was preeminantly in the people with birth months of September (Sep) and December (Dec). Branched type of pattern showed highest percentage in the birth month of February (Feb). Months of November (Nov), December (Dec)

and March (Mar) showed highest percentage of reticular type. Undetermined pattern was seen predominantly in the people born in the month of January (Jan). (Figure 3).

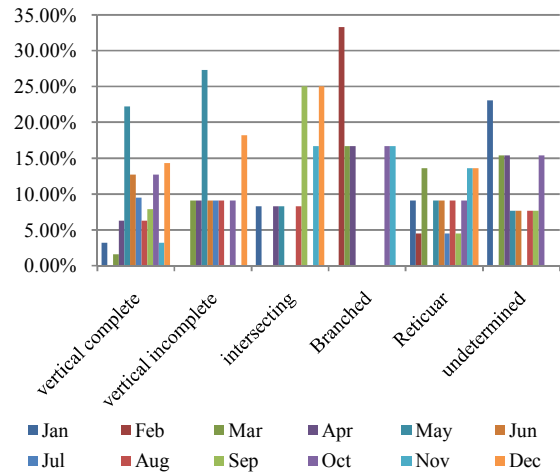


Figure 3 Month Wise Distribution of Different Types of Lip Prints

Analysis of palatal rugae revealed that 0% of samples had circular type of rugae pattern. Wavy type of rugae pattern was predominantly seen in the months of February, August (Aug), September, October (Oct) and November, which also exhibited uniform percentage within them. People born in the month of April (Apr) showed highest percentage of straight type. People with the birth month of November showed highest percentage of curved type of rugae pattern. (Figure 4)

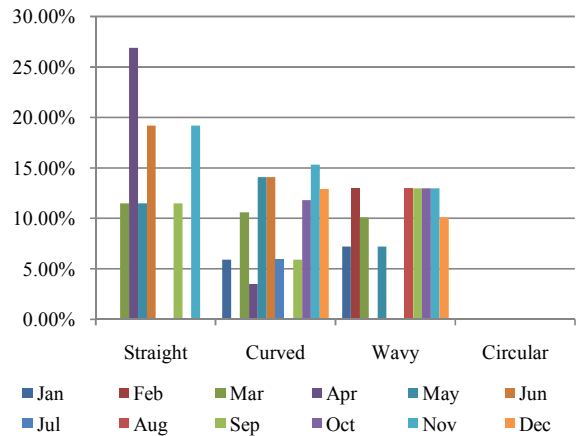


Figure 4 Month wise distribution of different types of palatal rugae

DISCUSSION

Lip prints were first described by an anthropologist named Fischer in 1902 and Edmond Locard in 1932 was the first person to use lip prints for personal identification⁽²⁾. Lip prints recover after undergoing alterations and doesnot vary with environmental factors. Palatal rugoscopy was first proposed in 1932, by a Spanish investigator Troban Hermaso⁽⁹⁾. Rugae remain intact by virtue of their internal position in the head when most other anatomical structures are destroyed or burned⁽¹⁰⁾. Various classifications had been proposed, but by most of the studies and in the present study, we followed the classification given by Lysell and Thomas and Kotze.^(1,9)

There are several studies available in the literature based on lip prints and palatal rugae as forensic tools. Some of the

studies were based on sex predilection^(1, 2, 4) using lip prints and palatal rugae and the other studies were performed in various populations (geographic locations)^(11, 12). According to the available literature intersecting and branched type of lip pattern is seen in males and vertical complete, incomplete patterns are predominant in females.⁽⁴⁾ In Palatal rugae patterns, curved and wavy are most common forms in both males and females.^(1,4,10)

Studies on various populations showed that straight forms of rugae are common in Caucasians, whereas wavy forms are common in Aborigines Australian Arborgians.⁽¹¹⁾ Vertical incomplete and branched type of lip pattern is common in Kerala, whereas reticular type is common in Manipuri population.⁽¹²⁾ Most common pattern of lip prints in the present study were vertical complete type and in palatal rugae, curved pattern was the most common type.

According to the present study we hypothesize that people born in the month of Feb have higher probability of branched type of lip pattern, whereas the month of April showed straight type of rugae pattern. Statistical tests revealed significant association of few types of lip prints, palatal rugae with birth month. Major limitation of the study was, numbers of samples were not equally distributed between the months.

CONCLUSION

Based on our findings, there is a significant association of lip prints and palatal rugae with birth month. Hence, it can be used as an adjunct information. But further studies are required with larger sample size to conclude on association of the same.

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