

Correlation and Comparison of Cheiloscopy, Dactyloscopy and Palatoscopy with Blood Groups among Dental Students From Western Maharashtra

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Abstract

Personal identification is of paramount importance in the forensic odontology for ethical, humanitarian and criminal investigations. In forensic odontology, scientific methods using DNA is considered to be the gold standard method of identification; however, it's expensive and time-consuming approach have circumvented the need for less expensive and faster methods of identification. The latest inexpensive approach of quantifying evidences for identification of suspect in crime is using lip print, fingerprint, palatal rugae & blood grouping and this has gained tremendous importance in the present days. Hence, the aim of the present study is to correlate and compare Cheiloscopy, Dactyloscopy and Palatoscopy with blood group and Rh factor. Method: A total of 200 dental students between the age group 18 to 25 years were included in the study. Lip print, finger print and palatal rugae patterns with ABO blood groups were collected and compared using Chi square test. The data was analysed using SPSS version 10.0 statistical package. Results & Conclusion: Statistically significant correlation existed between lip print and ABO-Rh factors (χ^2 statistic = 37.56, p value < 0.05) and between finger prints and ABO-Rh factors (χ^2 statistic = 30.6, p value < 0.05). No association was found between palatal rugae with ABO-Rhesus blood groups (χ^2 statistic = 17.71, p value > 0.05).

Key words: ABO Blood groups, Cheiloscopy, Dactyloscopy, Palatoscopy, Personal identification, Rh factor.

Introduction

Proper identification enacts an important step in forensic odontology that is required for ethical, humanitarian and criminal investigations as well as in archaeology and paleo demographic support research studies.^[1,2] Scientific methods using DNA are considered to be expensive and time-consuming approach, thus initiating the need for using less expensive and faster methods of identification. The methods using lip print, finger print and palatal rugae are considered to be unique to individuals and have gained tremendous importance in forensic odontology these days. Lip prints being unique to individuals, are formed by numerous elevations and depressions on the part of the lining mucosa called labial mucosa.^[3] The study of these lip prints is called as Cheiloscopy and was first noted in countries like Poland

and USA.^[4] Fingerprint, on the other hand, once formed remain unchanged from birth till death. These raised portions of epidermis that are differentiated during 3rd or 4th month of embryonic life are best seen on palmar planter surface of human hands.^[5] Cummins in 1926 coined the term Dactyloscopy for study of these entities.^[6] One more latest approach used for quantifying evidences of suspect in crime is studying the palatal rugae patterns present on the anterolateral aspect of hard palate. Due to its internal location in the head, these patterns usually, do not undergo any changes in one's life, the only exception being its length. Yet another biological record that remains unchanged during the life time of a person is blood grouping. Considering all these points, we decided to conduct a study to correlate and compare Cheiloscopy, Dactyloscopy and Palatoscopy

with blood group and Rh factor.

Material and Method

A cross sectional study design was conducted among 200 dental students during the period of December 2015 to March 2017. The study was initiated after obtaining the ethical clearance committee approval from Krishna institute of medical sciences “deemed to be university”, Karad with ref no. KIMSDU/IEC/03/2015 dated 10/12/2015. All the participants belonging to age group of 18-25 years were included in the study design. The exclusion criteria were subjects with deformities of palate like cleft palate, traumatic injury on fingers, palate and lips, allergy to alginate impression material. Informed verbal consent was taken from the included participants. Convenience method of sampling was used for the purpose of randomisation to avoid any selection or performance bias.

For lip print

The lips of the subjects were cleaned and lipstick was applied on the lips. Lip imprints were recorded with usual rest position on A4 sheets (Royal Executive Bond, 85 gsm, premium white) and visualized using the magnifying glass (TAG 3TM, 50mm double reading glass optical graded lens with 5x and 10x magnifying capacity). The lip prints were classified according to Suzuki K and Tsuchihashi Y as type I, I', II, III, IV, V. [7]

For finger print

The same subjects were asked to place his/her thumb over the stamp pad (CAMLIN COMPANY of size 157x 96mm). The finger prints were recorded on the A4 sheet by rolling their finger gently. Immediately after recording, the finger prints were interpreted using magnifying glass, based on Michael and Kucken's finger print classification. [8]

For palatal rugae

Alginate (dentsply) impressions of maxillary arch was obtained and casts were made using dental stone (dentstone). The rugae patterns were traced on these casts using a sharp HP graphite pencil and patterns were explored on these casts using magnifying lens. The palatal rugae were classified by Kapali S et al as curved, straight, wavy and circular. [9] All the participants with known blood group were included for the study. Statistical comparison between lip prints, finger prints and palatal rugae with ABO blood group and Rh factor

was done using chi square test and data was analysed using SPSS version 10.0 statistical package. The lip print, finger print and palatal rugae impressions are as shown in Figure 1.

Results

Amongst, the total sample of 200 dental students the female (72.5%) participants were more in number than the males (27.5%). Majority of the participants belonged to the blood group B (40%). About 96% of individuals were Rh positive and only 4% were Rh negative.

Comparison between lip print and ABO blood group:

In the present study, vertical lip print was the most predominant pattern (37%) followed by intersecting (22%), branched (21.5%), reticular (11.5%) and undetermined (8%). The percentage distribution of most prevalent lip print pattern with ABO blood groups is as shown in Figure 2. There was no significant association between lip prints and ABO blood group ($p > 0.05$) (χ^2 statistic = 18.84, $p = 0.093$).

Comparison between lip print and Rhesus factor:

There was no significant association of lip prints and Rhesus blood group as shown in Table 1 (χ^2 statistic = 6.758, $p = 0.149$).

Comparison between lip print and ABO-Rhesus blood group:

There was significant association between lip print patterns and ABO-Rhesus blood group as shown in Table 1 ($P < 0.05$) (χ^2 statistic = 37.56, $p = 0.0107$).

Comparison between finger print and ABO blood group:

The highest incidence of occurrence of finger print pattern among the participants was loops (62.5%) followed by whorl (29%) and the least being arch type (8.5%). Composite type was not found in our study. The percentage distribution of most prevalent finger print pattern with ABO blood groups is as shown in Figure 3. There was significant association between finger prints and ABO blood group (χ^2 statistic = 23.02, $p = 0.001$).

Comparison between finger print and Rhesus factor:

There was no significant association between finger prints and rhesus blood group as shown in Table 1 ($P >$

0.05) (χ^2 statistic = 0.963, p = 0.618).

Comparison between finger print and ABO-Rhesus blood group:

There was significant association between finger prints and ABO-Rhesus blood group as shown in Table 1 ($P < 0.05$) (χ^2 statistic = 30.6, p = 0.006).

Comparison between palatal rugae and ABO blood group:

The most predominant was wavy type (46%) followed by curved (38.5%) and straight type (15.5%). Circular type was not found in our study. The percentage distribution of most prevalent palatal rugae pattern with ABO blood groups is as shown in Figure 4. There was no significant association between palatal rugae and ABO blood group (χ^2 statistic = 6.13, p = 0.409).

Comparison between palatal rugae and Rhesus factor:

There was no significant association between palatal rugae and Rhesus factor as shown in Table 1 ($P > 0.05$) (χ^2 statistic = 0.466, p = 0.792).

Comparison between palatal rugae and ABO-Rhesus blood group:

There was no significant association found between palatal rugae and ABO-Rhesus blood groups as shown in Table 1 (χ^2 statistic = 17.71, p = 0.22).

Comparison of finger print, lip print and palatal rugae with ABO blood group and Rh factor

In the present study, finger print, lip print and palatal rugae were compared with the ABO -Rhesus blood group as shown in Table 1 (Lip print: χ^2 statistic = 37.56, p = 0.10, df = 28; Finger print: χ^2 statistic = 30.6, p = 0.006, df = 14; Palatal Rugae: χ^2 statistic = 17.71, p = 0.22, df = 14).



Figure 1 - Lip print, finger print, palatal rugae impressions

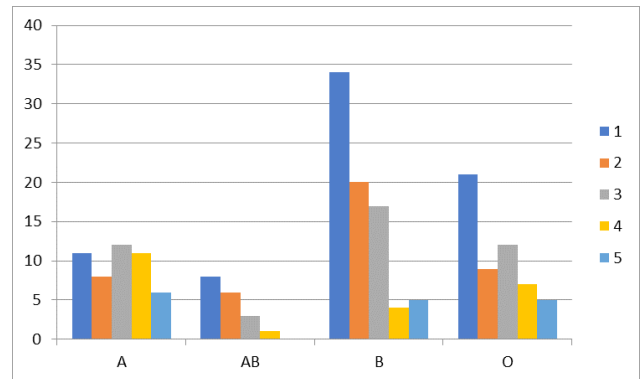


Figure 2 - Graph showing relation between lip print and blood group

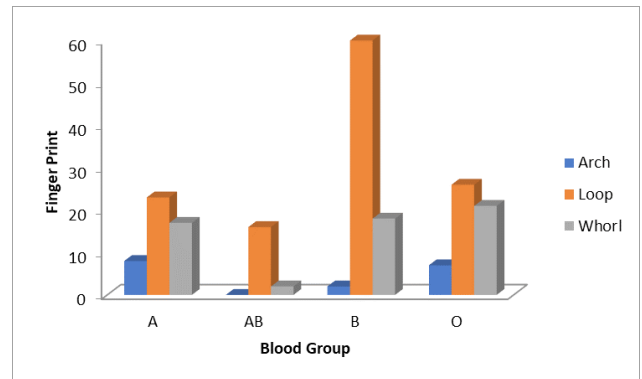


Figure 3 - Graph showing relation between finger print and blood group

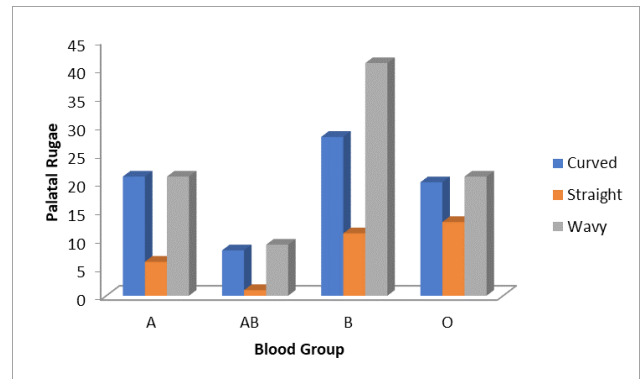


Figure 4 - Graph showing relation between palatal rugae and blood group

Table 1: Distribution of lip print, finger print and palatal rugae within ABO-Rhesus blood groups

Blood Group	Finger Print			Palatal Rugae			Lip Print				
	Arch	Loop	Whorl	Curved	Straight	Wavy	I	II	III	IV	V
A+ve	8(17.4)	23(50)	15(32.6)	21(45.7)	5(10.9)	20(43.5)	11(23.9)	6(13.0)	12(26.1)	11(23.9)	6(13.0)
A-ve	0(0.0)	0(0.0)	2(100.0)	0(0.0)	1(50.0)	1(50.0)	0(0.0)	2(100.0)	0(0.0)	0(0.0)	0(0.0)
AB+ve	0(0.0)	14(87.5)	2(12.5)	6(37.5)	1(6.3)	9(25.0)	6(37.5)	6(37.5)	3(18.8)	1(6.3)	0(0.0)
AB-ve	0(0.0)	2(100.0)	0(0.0)	2(100.0)	0(0.0)	0(0.0)	2(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
B+ve	2(2.6)	58(74.4)	18(23.1)	28(35.9)	11(14.1)	39(50.0)	32(41.0)	20(25.6)	17(21.8)	4(5.1)	5(6.4)
B-ve	0(0.0)	2(100.0)	0(0.0)	0(0.0)	0(0.0)	2(100.0)	2(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
O+ve	7(13.5)	24(46.1)	21(40.4)	18(34.6)	13(25)	21(40.4)	19(36.5)	9(17.3)	12(23.1)	7(13.4)	5(9.6)
O-ve	0(0.0)	2(100.0)	0(0.0)	2(100.0)	0(0.0)	0(0.0)	2(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)

Finger print: χ^2 statistic = 30.6, $p = 0.006$, $df = 14$

Palatal Rugae: χ^2 statistic = 17.71, $p = 0.22$, $df = 14$

Lip print: χ^2 statistic = 37.56, $p = 0.10$, $df = 28$

Discussion

In forensic identification, compilation of data from lip print, bite marks, fingerprint, blood groups in crime scenarios have played a benevolent role in identification of suspect in crime. However, no studies that compared and correlated all these parameters with blood groups. Hence, the present study is an attempt made to compare and correlate lip print, finger print and palatal rugae with blood group.

Lip print and blood group

Lip prints are unique to individuals and are present on the lining mucosa. The present study considered the basic pattern of lip prints given by Suzuki K and Tsuchihashi Y in 1971 as I, I', II, III, IV, V. [7] In the present study, I and I' are categorized as vertical lip print (type I); in accordance with study done by Nagasupriya A et al [10], where both partial and full vertical lip patterns were included under one category as vertical lip print (Type I). The present study showed that vertical pattern (37%) was the most predominant. These findings were in accordance with the study conducted by Patel S et al. [11] Karim B et al. [12] in 2013 among 122 subjects found that type II was predominant in A-ve blood group and type III with A+ve blood group which was in concordance with the present study. Verma P et al. [13] showed

branched pattern was the dominant pattern, which was not similar to the results obtained in the present study. So, studying in depth and establishing further facts and truth in lip print will certainly help us, as useful evidence in forensic science. [14]

Fingerprint and blood group

The epidermal ridges of the fingers and palms as well as the facial structures like the lip, alveolus, teeth and palate are formed from the same embryonic tissues (ectoderm) during the same embryonic period. [15] In our study the finger prints were recorded based on Michael and Kucken's finger print classification. [8] In the present study loop pattern showed the highest incidence of occurrence, followed by whorl and arch. These results were in accordance with the findings noticed by Mehta AA et al. [16] Sudikshya KC [17] conducted a study among 300 Nepalese, the study results revealed that whorls were more common in blood group B-ve which showed varied results when compared to the present study. In present study there was significant association between finger print patterns and ABO-Rhesus blood group ($p < 0.05$).

Palatal rugae and blood group

Palatal rugae due to their unique features have been widely used in personal identification. The classification of palatal rugae was given by Kapali S et al. [9], based on the shape. Study conducted by Hunasgi S et al. on palatal rugae in two different population and their

correlation with the sex of the individual showed that the wavy and curved patterns were predominant in Karnataka population compared to Kerala. ^[18] Saraf A et al. conducted a similar study where curved pattern was more common in males than females. ^[19] Since, varying results were obtained, the present study was done to correlate palatal rugae with blood group and Rh. In the present study wavy palatal rugae pattern is most dominant pattern followed by curved that was in accordance with the findings reported by Abdellatif AM et al. ^[20] Our attempt to correlate all the three parameters with blood group is to assess their usefulness in the forensic science such as in mass disaster scenarios were identifying unknown victims becomes challenging. To authenticate these results, equivalent studies should be conducted by using these parameters.

Conclusion

The present study was conducted to correlate and compare Cheiloscopy, Dactyloscopy and Palatoscopy with blood group and Rh factor. Statistically significant association of lip prints and finger prints with ABO-Rh blood groups were found in the present study. Furthermore, we would like to conclude that future studies should be conducted with larger sample size to determine the validity of the results of present study.

Conflict of Interest: Nil

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Ethical Clearance: KIMSDU/IEC/03/2015 dated 10/12/2015.

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