

Dermatoglyphics and their relationship with Blood Group

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Abstract : The vocabulary Dermatoglyphics was originally used by Harold and is extracted from the Greek terms derma, which means skin, and glyphics, which means curved. A 1926 graduate of Tulane University, Cummins. The Papillary or the Epidermal Ridges on the fingers and the pattern on the finger create the imprint known as a fingerprint. **Material and methods:** We were taken fingerprint through ink pad on white paper and analyzed with the help of a powerful magnifying hand lens and recorded it in a prepared format. **Result:** There was significant association between finger print pattern and blood group of males as the p-value of the significance of the association was 0.000038 (less than 0.05) in females was 0.0000048 (less than 0.05). **Conclusion:** There was significant association between finger print patterns and blood groups of male and female particples as well as in total as all the p-values are less than 0.05

Keywords: Dermatoglyphics, Blood Group, Gender, Relation

INTRODUCTION

Dr. Harold Cummins first popularized the study of patterns of fingerprint in 1926, but it has been practiced for many centuries before to that. In most cases, fingerprint patterns are used to identify a person. Today, every company, including certain government institutions in India, uses fingerprint verification to recognize each individual in a unique way. Fingerprints are also utilised as a biometric method for identifying a person's gender and age. ⁽¹⁾ The vocabulary Dermatoglyphics was originally used by Harold and is extracted from the Greek terms derma, which means skin, and glyphics, which means curved. A 1926 graduate of Tulane University, Cummins. ⁽²⁾ They grow between weeks 13 and 19 of pregnancy. ⁽³⁾ The Papillary or the Epidermal Ridges on the fingers and the pattern on the finger create the imprint known as a fingerprint. ⁽⁴⁾ The sort of finger print are particular to each person and is dependent on hereditary characteristics. The discharge in the fingerprints comprises metabolites and residues from several substances. It can be utilized for forensic purposes in order to identify potential victims ⁽⁴⁾ The trustworthy basis for identification, fingerprints are a continuous individuality trait. ⁽⁵⁾ The whorl, arch, loop and

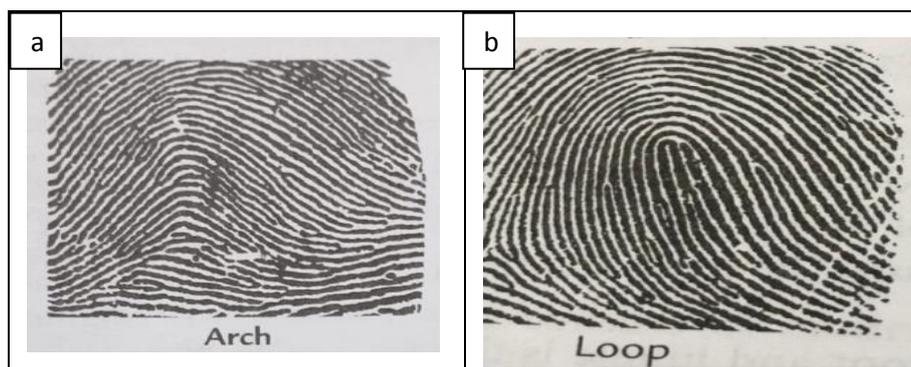
composite patterns are the four most prevalent fingerprint patterns. ⁽⁶⁾ The simplest and most uncommon designs are arches. Plain arch and tented arches are the two sorts. In both varieties, the ridge lines enter the pattern through one corner, rise in the centre, and then exit to the other corner. ⁽⁷⁾ Of all the patterns, the loop is among the most prevalent. Ridge lines that enter through one side of something like the printing, sweep up there in center like just a tent arch, and then turn around and exit the print tend to produce loops. Based about which part of finger the lines enter, loops are either radial or ulnar. ⁽⁸⁾ There are four distinct whorl patterns: simple, centre pocketed double loop, accidental whorl, and random whorl. These feature at least two deltas, while one or several of the ridge lines encircle the core in the shape of a circle, spiral, or another rounded, continuously curving shape. ⁽⁹⁾ The word "composite" refers to a mixture of layouts that do not fall under any of the categories mentioned above. ⁽¹⁰⁾ Blood group system was discovered by Karl Landsteiner, in 1901. 19 major groups have been identified which vary in their frequency of distribution amongst various races of mankind. Clinically, only 'ABO' and 'Rhesus' groups are of major importance, 'ABO' system is further classified as A, B, AB, O blood group types according to presence of corresponding antigen in plasma. ⁽¹¹⁾

Material and Methods:

QUALITATIVE ANALYSIS

The following parameters observed and compare between the cancer patients and control groups. Fingertip patterns under qualitative analysis:

Arches (A): Arches are the simplest and also rarest patterns. There are two types: plain and tented arches. **Loops (L):** Loop usually begins on one side of the finger and end on the same side. When this happens from ulnar side, it is called ulnar loop; if on radial side, then it is called radial. **Whorls (W):** This could be having multiple circular/ oval ridges, one around the other, or a single ridge, round in multiple rounds. There are two types of whorl- Spiral and Circular Composite(C) : It is a combination of more than one pattern, either a combination of arch, whorl or loop, or two different patterns- two whorls/ two arches/ two loops ⁽¹²⁻¹⁸⁾



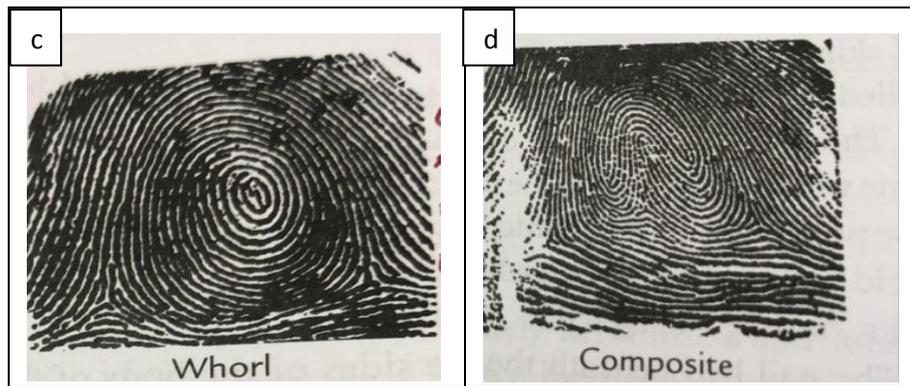
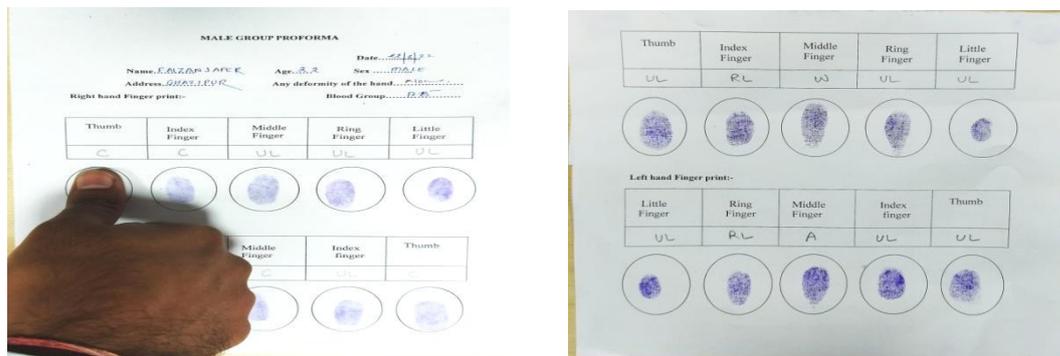


Figure: showing the finger pattern of the samples presenting (a) Arches pattern, (b) loop pattern, (c) Whorl pattern, (d) composite pattern.

Blood group:

There are two main therapeutically relevant blood categorization systems.^{19, 20} They are ABO Blood System and Rh System. Genetics governs the antigens (agglutinogens). The agglutinogens in the ABO system are "A" and "B." Each person has two chromosomes that carry one of each of the three allelomorphic genes responsible for the A, B, and O traits, one from each parent.²¹



The hand will wash with soap and water and humidity clean off with sprit. After drying the hands, ink pad use for the impression of fingerprint patterns. The plain white paper of A 4 size will be kept on the table. The subject will be ask to press their fingers on the blue colour ink pad and then the finger (palmer side) areas will be carefully and uniformly placed on the white sheet paper. The fingerprint pattern (Loop, Arch, Whorl, composites) will be observing with the help of a powerful magnifying lens and recorded in a specially prepared format. In our study the digits will classified according to Henry's system.

INCLUSION CRITERIA:

- 1- Normal subject
- 2- Subjects have no scars on their fingers or thumbs no any birth deformities.

EXCLUSION CRITERIA:

- 3- Subjects with permanent scars on their fingers or thumbs with any hand deformities due to injury like burn were excluded from study.
- 4- Any systemic diseases of the skin such as Psoriasis, Leprosy involving fingertip patterns and Uncooperative patients.

**Stamp pad & Magnifying Lens , subject hand and glass plate.****RESULTS:**

Table 1 Finger print pattern of males in different blood groups and their significance
Finger print pattern of males in different blood group.

Finger print pattern of males in different blood groups						
Finger print pattern	Blood Group				Total	p-value & statistical significance
	A	AB	B	O		
Arch	63(7.3%)	37(9.3%)	133(10.6%)	61(12.7%)	294(9.8%)	0.000038 (Significant)
Composite	75(8.7%)	44(11%)	75(6%)	36(7.5%)	230(7.7%)	
Loop	427(49.7%)	199(49.8%)	602(47.8%)	191(39.8%)	1419(47.3%)	
Whorl	295(34.3%)	120(30%)	450(35.7%)	192(40%)	1057(35.2%)	
Total	860(100%)	400(100%)	1260(100%)	480(100%)	3000(100%)	

Table 2- Finger print pattern of females in different blood groups and their significance

Finger print pattern of females from different blood groups.						
Finger print pattern	Blood group				Total	p-value & statistical significance
	A	AB	B	O		
Arch	37(3.8%)	71(8.1%)	60(8.5%)	25(5.8%)	193(6.4%)	0.0000048

Composite	43(4.4%)	63(7.2%)	34(4.8%)	24(5.6%)	164(5.5%)	(Significant)
Loop	554(56.5%)	452(51.4%)	420(59.2%)	225(52.3%)	1651(55%)	
Whorl	346(35.3%)	294(33.4%)	196(27.6%)	156(36.3%)	992(33.1%)	
Total	980(100%)	880(100%)	710(100%)	430(100%)	3000(100%)	

Table 3- Finger print pattern in different blood groups and their significance

Finger print pattern of all the participants from different blood groups.						
Finger print pattern	Blood group				Total	p-value & statistical significance
	A	AB	B	O		
Arch	100(5.4%)	108(8.4%)	193(9.8%)	86(9.5%)	487(8.1%)	0.00000016 (Significant)
Composite	118(6.4%)	107(8.4%)	109(5.5%)	60(6.6%)	394(6.6%)	
Loop	981(53.3%)	651(50.9%)	1022(51.9%)	416(45.7%)	3070(51.2%)	
Whorl	641(34.8%)	414(32.3%)	646(32.8%)	348(38.2%)	2049(34.2%)	
Total	1840(100%)	1280(100%)	1970(100%)	910(100%)	6000(100%)	

DISCUSSION

In our study finger print pattern of males and females from different blood groups, the loop was the most frequent finger print in all the blood groups followed by whorl and arch was least frequent finger print in blood group A and AB while composite was most frequent finger print in blood group B and O. In male total loop was present in 1419 (47.3%) followed by whorl 1057 (35.2%), arch 294 (9.8%) and composite 230 (7.7%), and female loop was present in 1651 (55%) female followed by whorl 992(33.1%), arch 193(6.4%) & composite 164(5.5%). Loop was the most frequent finger print in all the blood groups followed by whorl and arch was least frequent finger print in blood group A while composite was most frequent finger print in blood groups AB, B and O. In similar study, conducted by **Nitin et al.** Ulnar loop was the most prevalent fingerprint pattern in both the overall population and the sex-wise distribution.¹³ In the similar study conducted by **Dr. Radhika. R.H** located The loop dactylographic pattern was most commonly observed in blood groups "O" positive, which is the most prevalent blood group, and "AB" negative, which is missing.¹³⁰ **Azhagiri et al.** According to this study, the most prevalent fingerprint pattern among

the participants was the loop. The least frequent motif was shown to be the arch. There was proof that the gender, blood type, and fingerprint patterns were correlated. Along with helping to identify the victims at a crime scene, the existence of such a link may allow for the prognosis of specific illness stages. An prior paper on the utilisation of blood type and fingerprint pattern in criminal identification and in circumstances like mass catastrophes supports our conclusions. Similar to our findings, this^{26,189}

REFERENCES

1. Basha PMA, Gethavani G, et. al. Association of palmar fingerprint pattern in ABO Blood group system. Sch. Int. J. Anat. Physiology;Vol-1,Iss-4 (Nov-Dec,2018):133-136
2. Kumar AKR, Manoranjitham.et al. Study of finger print patterns among medical students. Int J Anat Res 2016,Vol 4(2):2273-76.ISSN 2321-4287
3. Bharadwaja A, Saraswat P.K. et. al. Pattern of Finger-Prints in different ABO Blood Groups. JIAFM, 2004; 26(1). ISSN 0971-0973
4. Singh B, Jafar S et. al . Role of Finger Print Pattern in Relationship with blood group and gender JMSCR Vol 04,Issue 03,page 9651-9655 march
5. Rathee SK, Priyanka et.al. Distribution of Fingerprint in Relationship to Gender and Blood Group in North India Population (Predominantly Haryanvi) Int. J. health of Sci & Research Vol.6; Issue :6; june 2016.
6. Chanda D, Thakurta TG, et.al. Dactylographic Pattern and its Relationship with A Rhesus Blood group .IOSR Journal of Dental and Medical Sciences .Volume17,Issue3Ver.19March.(2018),PP 35-39
7. RalotiSK, Sha KA, PatelVC, Mental AK, Mori RN, Chaudhri NK . et.al . An effort to Determine Blood Group and Gender From Pattern of Finger Prints. Natl J Community Med ,Volume 4 ,Issue1 ,Jan –March 2013
8. Radhika.R.H. Pattern of Fingerprints and their relation with blood groups. Indian Journal of Basic and Applied Medical Research; March 2016:Vol,-5 Issue-2,P.744-749
9. Soman MA, Avadhani R, Jacob M, Nallatham by R.et al. Study of Fingerprint Patterns in Relationship with Blood Group and Gender. International Journal of Current Research Vol.5, Issue12, pp. 3994-3997, December, 2013
10. Mohsin TS, Hasan HS, et .al. The Relation between left thumb fingerprint type with blood group and gender among students of Al- Kindy College of Medicine, 2019. Prensa Med Argent, Volume 106: 1. 174.
11. Bijlani RL ,Texbook of physiology .2nded blood groups:93-94.
12. Subrahmanyam BV. ''Personal identity'' in Modi's Medical Jurisprudence and Toxicology, pp. 79-87, Butterworths India, New Delhi, India, 2013.
13. Herschel WJ. The origin of finger-printing. H. Milford, Oxford University Press; 1916.

14. Seema MA, Gandhi D, Singh M. Dermatoglyphics Study and Review of literature. *Novel Science International Journal of Medical Science*. 2012; 1 (6):191-8.
15. V. J. Pillay, *Textbook of Forensic Medicine Toxicology* (15Ed. Hyderabad: Paras Medical Publisher, (2009), 53-94.
16. Bloterogel H, Bloterogel W. Blutgrupe and Dactylogramm: Konstitutionsmerk male der poliomyelitis Krapan Ztrehsf Hindrih, 1934; 56: 143-63.
17. Bijlani RL, 1997. *Textbook of Physiology*. 2nd ed. Blood Groups: 93–94.
18. Bharadwaja A, Saraswat PK, Agrawal SK, et al. 2004. Pattern of fingerprints in different ABO blood groups. *Journal of Forensic Medicine and Toxicology*, 21(2):49- 52.
19. Wikipedia. Big Five Personality Traits. (1990).
20. Azahagiri R., etal. "Analylysis of left thum print pattern among different human blood group". *International Journal of Anatomical Varitions* 11.3(2018): 103-106.
21. Cowen P., etal. "Shorter Oxford Textbook of Psychiatry". 6th edition. Oxford university Press (2012): 130.
22. Nithin MD, Balaraj BM, Manjunatha B, Mestri SC. Study of fingerprint classification and their gender distribution among South Indian population. *J Forensic Leg Med* 2009; 16:460-3.
23. Radhika T., et al. "Tongue prints: A novel biometric and potential forensic tool". *Journal of Forensic and Legal Medicine* 8.3 (2016): 117-119.
24. Azhagiri R, Anitha M, Hemapriya J (2018) Analysis of left thumb print pattern among diferent human blood groups. *Int J Anat Var* 11:103–106.
25. Bardale R. *Forensic Medicine and Toxicology*, Department of Forensic Medicine, Government Medical College and Hospital, Nagpur (Maharashtra), India (2011).