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Original Research Article

FINGERPRINT PATTERN AMONG ADULT SUBJECTS IN MEDICAL COLLEGE IN SOUTHERN RAJASTHAN

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Abstract

Aim: The aim of the present investigation is to study Fingerprint Pattern among Adult Subjects in Medical College in Southern Rajasthan.

Material & Methods: The study was carried at Private Medical College and Hospital, Rajasthan. The material consisted of 8000 fingerprints taken from 800 medical students among which 400 were males and 400 were females. Consent in the written form was taken from the study subjects before taking the fingerprints. The cross study was conducted in 2017 and 2018 after getting approval from Institutional ethics committee of respective college. Healthy subjects who participated voluntarily were included in the study and their age ranged from 18-24 yrs. Subjects with permanent scars on their fingers and with hand deformities were excluded from the study.

Results: Among 8000 fingerprints taken, loops were the most common pattern followed by whorls and arches were the least common. Whorls were higher in ring fingers, followed by index and thumb. Loops were most often observed on little finger followed by middle finger and thumb. Frequency of arches were higher in index finger.

Conclusion: Our study showed that the most common type of pattern observed in Marathi population is ulnar loop followed by whorls in both males and females. However, the frequency of whorl pattern is greater in ring finger in both the genders. No statistically significant differences are observed in the fingerprint pattern distribution between males and females.

Keywords: Fingerprint Pattern, Adult Subjects, Medical College, Southern Rajasthan, Qin and Han Dynasties.

Introduction

Human fingerprints are detailed, nearly unique, difficult to change , and sturdy over the lifetime of a private , making them suitable as long-term markers of human identity. No two fingerprints have ever been found to be identical and even identical twins have different prints [1, 2]. Sometimes, fingerprints were found helpful to determining gender and blood type also . Finger prints are used since 3000 BC as suggested by Chinese historical documents. Both the Qin and Han Dynasties (221 BC – 220 BC) were reported to use the hand prints for identification purpose and as forensic record [2,3]. Ancient Indian documents also suggested the practice of using finger prints for identification.

The fingerprint impressions are often found on the varied surfaces like pliable, fragile and rigid objects. There could also be two sorts of impression visible and latent. The visible impression is one which doesn't need development, whereas the latent impression requires a correct enhancement or treatment by the utilization of chemical reagent or physical development powder [4].

There are differing types of Fingertip Patterns. the small print are as follows.

ARCH (A): An arch is that the simplest pattern. It consists of more or less parallel ridges. The ridges curve the pattern area. The curve is proximally concave.
LOOP (L): it's the foremost frequent pattern on fingertip. During this configuration series of ridges enter and leave the pattern area on same side.

WHORLS (W): consistent with Galton's classification, whorl is any ridge configuration with two or more triradii [5-8]. The aim of this investigation is to review Fingerprint Pattern among Adult Subjects in Medical College in Southern Rajasthan.

Material & Methods

The study was carried at Private Medical College and Hospital, Rajasthan. The material consisted of 8000 fingerprints taken from 800 medical students among which 400 were males and 400 were females. Consent in the written form was taken from the study subjects before taking the fingerprints.

The cross study was conducted in 2017 and 2018 after getting approval from Institutional ethics panel of

respective college. Healthy subjects who participated voluntarily were included within the study and their age ranged from 18-24 yrs. Subjects with permanent scars on their fingers and with hand deformities were excluded from the study. The fingerprints were taken by using Ink method as described by Cummins and Midlo [9]. The Kores duplicating ink, ink pad, glass plate, roller, gauze pads, soap, white book , magnifying hand lens and soap were used for obtaining fingerprints. Subjects were advised to scrub their hands and made to dry. Ink was applied on the ink pad and uniformly smeared. . The fingers were rolled on the ink slab then placed on a white book w it h one lateral edge and rolled over in other way. Thus an imprint of ten fingertips of both hands was recorded on the white book. After the prints were dried sheets were marked with name, age and sex. After taking the imprints of all fingers, the ink was removed by using soap and water. The chemical analysis of fingertip patterns was studied with help of a magnifying lens. In our study, the classification of fingerprints into Loops, Arches and Whorls was considered from the fingerprints were tabulated, compared and analyzed.

The subjects were asked to scrub and dry their hands before giving the samples. They were then asked to roll their finger bulbs on the plate smeared with ink and imprint it on the 10-digit fingerprint identification slip designed for the study. Excessive pressure on the fingers while inking and recording was avoided [10]. The patterns on the rolled finger impressions were identified.

Results

Table 1 shows the distribution of fingerprint patterns in right and left hands of 800 medical students. Among 8000 fingerprints taken, loops were the most common pattern followed by whorls and arches were the least common. Whorls were higher in ring fingers, followed by index and thumb. Loops were most often observed on little finger followed by middle finger and thumb. Frequency of arches were higher in index finger. From this it is evident that the difference in overall distribution of fingerprint pattern in both hands of males and females was insignificant.

Table 1: Distribution of Fingerprint patterns in Right and left Hands

Digits		n	Whorls	Loops	Arches
Thumb	Right	800	215	371	21
	Left	800	214	359	35
Index	Right	800	245	306	73
	Left	800	231	290	82
Middle	Right	800	134	428	37
	Left	800	170	388	52
Ring	Right	800	324	262	21
	Left	800	295	296	23
Little	Right	800	140	435	26
	Left	800	120	459	20

n – Number of subjects

In the present study, the ulnar loop was found to be the most predominant pattern. Population wise percentage distribution of pattern types in 400 female and 400 male subjects is shown in Table 2.

Table 2: Percentage distribution of fingerprint patterns in Marathi population

Patterns	Males (%)	Females (%)
Ulnar loop	48.25	58.44
Whorl	28.10	28
Twinned Loop	9.38	8
Central Pocket	6.36	7.22
Radial Loop	4.79	1.98
Accidental	1.22	3.55
Tented Arch	0.81	2.22
Plain Arch	0.82	2.32
Lateral Pocket Loop	0.96	1.81

Discussion

The finger ridge pattern is exclusive for a n individual and therefore the development of ridge pattern is genetically determined and remain unchanged throughout life. The epidermal ridge patterns are formed between 10th and 24th week of gestation [11]. The critical growth of the brain also occurs during this era . Since the skin and brain develop from an equivalent ectoderm, dermatoglyphic variations are evidence for early develop- mental brain disturbances [12]. In our study the upper percentage of patterns were loops followed by whorls then arches. this is often in conformity with the worldwide distribution and with the foremost of the studies conducted previously [13, 14]. But whorls were predominant pattern, followed by loops then arches within the study done by Rastogi [15] and therefore the study among British individuals [15]. within the present study maximum percentage of loops were seen on the small finger and finger which coincides with the results of Kanchan et al., [16]. the utmost whorls were seen on the annualry which also coincides with Kanchan et al. Arches were higher within the index which is analogous to the results of Mehta et al and British individuals. The difference between the distribution of fingerprint patterns among males and females of Marathi population was found to be statistically insignificant which is in accordance with Jaga et al., [17].

Conclusion

Our study showed that the foremost common sort of pattern observed in Marathi population is ulnar loop followed by whorls in both males and females. However, the frequency of whorl pattern is bigger in annually in both the genders. No statistically significant differences are observed in the fingerprint pattern distribution between males and females. Similar studies with different ethnic groups/populations and considering the likelihood of existence of sexual dimorphism would be anticipated within the near future. Loops were the predominant pattern in both males and females. Higher percentage of loops was observed on the annually whereas highest preponderance of arches was present in index. Distribution of dermatoglyphic patterns was almost similar on both hands and both sexes. So we couldn't establish the bilateral variations and gender based differences.

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