Original Article

FINGERPRINT ANALYSIS OF ETHNIC FEMALE KUWAITIS

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Abstract:

Fingerprint patterns and palmar dermatoglyphics have, over the decades not only been of significant application in identity establishment in forensics, but also played an adjunct role in diagnosis and confirmation of quite a few medical afflictions and syndromes.

Many data banks on fingerprint profiles covering gender and diverse populations, ethnic groups and occupations have been compiled and are readily available for application and analysis. Observations of oddities, peculiarities or exclusiveness in print patterns across peoples have led to the accumulation of reliable markers that aid diagnostics and in specific assignments based on sex, disease, inheritance (both genotype and phenotype) and in classifications.

This paper presents observations on fingerprint patterns and their variations found in adult Kuwaiti females from the Middle-east. A total of 360 prints were collected and results were collated for analysis. The results show a distinct difference in pattern in this ethnic populace, an increased frequency in ulnar loops. This undertaking, to my knowledge, is the first ever to cover a native Arab, could form the nucleus for more such and larger scale studies.

Keywords : dermatoglyphics, dactylography, physical anthropology, ethnicity

Introduction

The history fingerprinting and their study (dactylography) has special significance to India as it is the original home to the first ever forensic fingerprint institute to be established in 1897 (Calcutta) the world. Since those early times, the science of recording fingertip pulp prints and their classification into characteristic individualized patterns, according to their digital ridge counts and shapes, has grown in leaps and bounds universally. The near foolproof system of establishing identity through exclusively individual characteristics has formed the backbone and mainstay in forensic investigations and in criminal judicial processes. However, despite the impressive and time proven record of dactylography as a major and reliable tool in physical anthropological sciences, the potential of application of dermatopglyphics as a dependable and adjunct tool n the world of diagnostics and clinical medicine has remained unexploited.

In recent years, analysis of specific loci of the proximal and distal tri-radii and the measurements of the A t D angles through palmar prints has emerged as a significant subject area for research in prognosticating and diagnosing a slew of medical afflictions, congenital or acquired. The study of palmar ridges, creases and flexure lines and their variations led to the consistent observation of a transverse palmar crease (simian crease) as an unfailingly accurate external marker for Down syndrome is proof enough if any needed be provided, on the scope and ambit of dermatoglyphics and dactylography as major areas for clinical investigations and research. This paper however, does not include the observations on palm patterns in its scope. Significantly, in the world of physical and forensic anthropology, the analysis of prints from data banks the world over has resulted in extraction of reliable and conclusive similarities in print patterns distinct to populations, geo-locales, races and ethnic groups (1).

In this paper we present and analyze fingerprint patterns from 36 adult Kuwaiti women and compare the results with that found in other population groups. The middle

eastern population is of ethnic Arab descent and little, if anything, by way of dermatographics is known about these nationals. Though small, the sample population taken up for this study is perhaps the first ever to be researched on.

MATERIAL & METHODS

Individual digital and palm prints were collected from 36 healthy adult female volunteers from the Faculty of Medicine of Kuwait University. Each volunteer was required to impress transfer inked palm and finger prints onto clean non-absorbent white drawing sheet. Two palm prints and ten finger prints were taken from each individual. Each print was then separately studied using hand-held magnifying lens. The patterns, shapes, ridge counts, variations and oddities (if any) for each finger print was recorded.

The results of the observations were tabulated for statistical analysis and comparison.

Observations & Results

The results of this study are presented in the Tables I, II, III, IV, V & VI. The most significant of the observations was that the radial loop pattern found in Kuwaitis was 5 to 10 times higher when compared to similar loops in other population groups. Taking only the female gender for comparison showed that this loop was 4 times more in Arab women than in females elsewhere. The ulnar loop too, was found strikingly lower in numbers in the study group when compared to the results from that recorded in other studies.

The percentage and numbers of whorls and arches however were consistent with those recorded in other data compilations. The levels in individual print pattern variations were same as those found in the general population elsewhere.

Discussion

For long, the hand has been considered as a mirror of health and disease. The size, shape, pallor, elasticity, strength, mobility of the hand have been used as diagnostic factors in general physical examination: more specifically the positions of fingers, their lengths, positions, shapes metacarpal formulas, nail growth rates patterns and rates have often led to clues to particular affliction or disease, be it congenital or acquired (2). Study of the skin of the hand, more importantly on its volar aspect, such flexure lines, creases, finger tip ridge shapes and counts, are covered under the science of palmar dermatoglyphics (3) and dactylography.

Research work involving the creases and patterns, apart from use as base markers by themselves, have also led to newer applications. The position of the distally positioned tri-radii (A B C & D) and the A t D angle formed by the first and last digital base tri-radius (A & D) with the axial tri-radius (t) has been very effectively and confidently used and applied and are of pathognomic value if congenital genetically inherited conditions such as Marfan's syndrome

It is known that 20% to 30% of hand and fingerprints show bilateral asymmetry in patterns. Whorls and radial loops being more frequent on the right side and ulnar loops being more common on the left. Females generally show a tendency to be lower in presence of whorls and radial loops while simultaneously display higher numbers in arches; World over, men show a more complex print pattern than in women.

In contrast and in contradiction the observed norm, this study, however, women showed a higher frequency of ulnar loops on their right hand than on the left. The significance or import of the observed ethnic variations are still nebulous and may require larger study groups covering bigger populations in the middle-east for interpretation.

Conclusions

Large scale studies on diverse populations and large

Finger print patterns, ridge counts, palmar crease studies, flexure line analysis, statistical and scalar and angular analysis of tri-radii loci (A t D) could throw up much by way of our understanding and interpretations on the complexities of disease diagnosis and treatment: With wider applications of collated data and further research, the science of dermatotoglyphics and dactylography may yet prove to be a more potent and reliable tools in medical armamentarium than they presently are.

Table - I
(Fingerprint patterns)

	RIGHT					LEFT					RIGHT			LEFT		
	1	2	3	4	5	1	2	3	4	5	A	L	W	A	L	w
1	UL	UL	TA	TA	UL	TA	TA	TA	TA	RL	2	3		4	1	
2	SW	CW	UL	UL	UL	CW	SW	TA	RL	RL		3	2	1	2	2
3	UL	CW	UL	SW	UL	RL	TA	TLW	SW	SW		3	2	1	1	3
4	UL	SW	UL	SW	UL	SW	SW	SW	CPW	RL		3	2		1	4
5	SA	SA	UL	CPW	TA	SA	SA	RL	RL	CPW	3	1	1	2	2	1
6	CW	SW	UL	CPW	CPW	CW	SW	RL	RL	RL		1	4		3	2
7	CW	CW	CPW	SW	CPW	CW	RL	CW	CW	UL			5		2	3
8	UL	TA	UL	UL	UL	CW	SA	RL	RL	SA	1	4		2	2	1
9	UL	UL	UL	TLW	SW	RL	RL	TA	CPW	CW		3	2	1	2	2
10	UL	CW	UL	CPW	UL	RL	RL	RL	RL	RL		3	2	5		
11	UL	TA	UL	SW	CW	RL	TLW	RL	CW	CW	1	2	2		2	3
12	UL	TA	TA	TA	UL	RL	TA	RL	RL	CPW	3	2		1	3	1
13	CW	SW	UL	SW	UL	TLW	CPW	RL	RL	RL		2	3		3	2
14	CW	SW	SW	SW	CW	CW	SW	SW	SW	CLW			5			5
15	UL	TA	UL	NC	NC	RL	RL	TA	RL	RL	1	2		1	4	
16	CW	TLW	SW	CW	CPW	SW	SW	RL	SW	RL			5		2	3
17	RL	TA	RL	RL	RL	TLW	UL	RL	RL	RL	1	4			4	1
18	CW	SW	SW	SW	SW	RL	CW	CW	TLW	RL			5		2	3
19	SW	TLW	SW	SW	CPW	SW	CPW	CPW	CPW	RL			5		1	4
20	TLW	UL	UL	SW	SW	CW	RL	RL	TLW	RL		2	3		3	2
21	UL	UL	CW	SW	RL	RL	RL	RL	CW	RL		3	2		4	1
22	UL	UL	UL	UL	UL	RL	RL	RL	SW	RL		5			4	1
23	UL	UL	UL	CW	UL	RL	TA	RL	CPW	RL		4	1	1	3	1
24	CW	TLW	UL	UL	UL	TLW	RL	RL	RL	RL		3	2		4	1
25	SW	TLW	UL	UL	UL	TLW	SW	RL	RL	RL		3	2		3	2
26	UL	UL	UL	UL	UL	RL	RL	RL	RL	RL		5			5	
27	UL	UL	UL	UL	UL	RL	UL	UL	RL	RL		5			5	

Table - I (Continued)

	RIGHT					LEFT					RIGHT			LEFT		
	1	2	3	4	5	1	2	3	4	5	A	L	W	A	L	w
28	UL	CPW	SW	SW	UL	RL	SW	SW	CPW	RL		2	3		2	3
29	UL	RL	UL	UL	UL	RL	RL	RL	CPW	RL	5				4	1
30	SW	SW	UL	CPW	UL	SW	CPW	TA	CPW	CPW	2	3		1		4
31	UL	CPW	UL	UL	UL	RL	RL	RL	RL	RL	4	1			5	
32	UL	CPW	CPW	CPW	CPW	RL	CPW	CPW	CPW	UL	1	4			2	3
33	UL	UL	UL	UL	UL	RL	CW	RL	RL	RL	5				4	1
34	CPW	CPW	UL	SW	UL	SW	SW	CPW	SW	CPW	2	3				5
35	CPW	CW	UL	RL	UL	SW	CW	RL	SW	RL	3	2			2	3
36	UL	CPW	UL	UL	UL	RL	RL	RL	CPW	RL	4	1			4	1
										TOTAL	12	94	72	15	96	69

Table – II
(Total Patterns)

	ARCHES	LOOPS	WHORLS
RIGHT	12	94	72
LEFT	15	96	69
TOTAL	27	190	141

Table – III
(Percentage Frequencies)
ARCH RADIAL LOOP ULNAR LOOP

DIGIT	ARCH Right	ARCH Left	RADIAL LOOP Right	RADIAL LOOP Left	ULNAR LOOP Right	ULNAR LOOP Left
I	1	2	1	18	20	0
II	6	6	1	12	9	2
III	2	5	1	21	25	1
IV	2	1	2	15	11	0
V	1	1	2	25	22	2
TOTAL	12	15	7	91	87	5
MEAN	2.7		9.8		9.2	
%	7.5		27.72		25.5	

Table – IV
(% Comparative data)

ORIENTAL	WHORL Mean	UL Mean	RL Mean	ARCHES Mean
1. Caucasians	35.4	55.5	4.3	4.3
2. Negroes	27.1	61.4	2.6	8.8
3. Asian Ind.	42.6	33.59	2.2	3.4
4. Kuwaiti	39.16	25.5	27.72	7.5

Table – V
Percentage data on female population

FEMALES	ARCH	RADIAL LOOP	ULNAR LOOP	WHORLS
World	9.2	3.8	63.0	24.0
Kuwaiti	7.5	27.72	25.5	39.16

Table – VI
(Digital Pattern Types)

A. Caucasians

Whorl	IV	I	II	III	V
Loop	V	III	I	IV	II
Arch	II	III	I	IV	V

B. Negroes

Whorl	I	IV	II	III	V
Loop	V	III	IV	II	I
Arch	II	I	III	IV	V

C. Asian Ind.

Whorl	I	IV	II	V	III
Loop	V	III	II	I	IV
Arch	II	III	I	IV	V

D. Kuwaiti

Whorl	IV	II	I	V	III
Loop	V	III	I	IV	II
Arch	II	III	I	IV	V

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