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ORIGINAL RESEARCH

Assessment of right plantar dermatoglyphic configurations in study population

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ABSTRACT

Background: Dermatoglyphics is defined as the study of the configurations formed by the ridges of the palm and sole of the hands and feet respectively. The present study was conducted to assess right plantar dermatoglyphic configurations in study population.**Materials & Methods:**200 subjects within the age group 18-45 years of both genders were selected. Dermatoglyphic prints were taken by the ink and roller method. The foot prints taken were then observed with the help of a magnifying glass for different dermatoglyphic patterns on the sole which was divisible into various areas: RtTh/H/ID1, Rt ID2, Rt ID3, Rt ID4, Rt HTD, Rt HTP and Rt C.**Results:** Out of 200 subjects, males were 90 and females were 100. PatternonRtTh/H/ID1 in males and females was arch in 1 and 4, whorl in 3 and 5, distal loop in 52 and 76, proximal loop in 2 and 5, tibial loop in 15 and 10 and vestiges in 7 and 6 and open fields in 9 and 4 subjects respectively. The difference was significant (P< 0.05). PatternonRt ID2 in males and females was whorl in 1 and 2, distal loop in 12 and 6, proximal loop in 20 and 70, tibial loop in 2 and 13, vestiges in 1 and 7 and open fields in 54 and 12 subjects respectively. The difference was significant (P< 0.05). Patterns on Rt ID3 in males and females was whorl in 1 and 3, distal loop in 22 and 56, proximal loop in 0 and 5, tibial loop in 2 and 11, vestiges in 2 and 9 and open fields in 43 and 26 subjects respectively. The difference was significant (P< 0.05). PatternonRt ID4 in males and females was distal loop in 13 and 30, proximal loop in 4 and 7, vestiges in 8 and 13 and open fields in 45 and 60 subjects respectively. The difference was significant (P< 0.05).**Conclusion:**The male and female individuals differ significantly from one another. As such, the plantar dermatoglyphic patterns may be a valuable instrument in forensic and medico-legal contexts for determining an individual's gender.

Keywords: Dermatoglyphics,foot prints, Whorl

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INTRODUCTION

Dermatoglyphics is defined as the study of the configurations formed by the ridges of the palm and sole of the hands and feet respectively.[1] It is a well-established fact that these epidermal ridges which lead to the formation of a distinct pattern are a characteristic feature of any individual.[2] Dermatoglyphics is now acknowledged as a powerful tool in anthropological, genetic, and medico-legal research. Determining the ethnic variance and affiliations among various groups is another important function of dermatologoglyphics.[4] Early in the foetal life, the epidermal ridges start to form. It starts during the 12th week of pregnancy and lasts until the 19th week. It has been noted that the development of the palmar ridge patterns occurs before the formation of the plantar epidermal ridge patterns.[4] Thesedermatoglyphic configurations are impacted by a variety of environmental influences in the womb in addition to inherited elements. Once established, these patterns don't alter over the course of a person's lifetime.[5]

The fact that even the monozygotic twins' dermatoglyphic prints differ from one another serves as evidence for this.[6] These dermatoglyphic patterns' scientific properties are used in medicine to diagnose a variety of congenital genetic illnesses and resolve disputed paternity cases. The palm and sole skin is characterized by a thick cornfied layer with prominent papillae, a large number of nerve endings and eccrine sweat units, and a paucity of hair follicles when viewed histologically.[7]The present study was conducted to assess right plantar dermatoglyphic configurations in study population.

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MATERIALS & METHODS

The present study was conducted on200 subjects within the age group 18-45 yearsof both genders.All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Dermatoglyphic prints were taken by the ink and roller method. The foot prints taken were then observed with the help of a magnifying glass for different dermatoglyphic patterns on the sole which was divisible into various areas: RtTh/H/ID1, Rt ID2, Rt ID3, Rt ID4, Rt HTD, Rt HTP and Rt C. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 200		
Gender	**Male**	**Female**
Number	90	110

Table I shows that out of 200 subjects, males were 90 and females were 110.

Table II Assessment of type of pattern on RtTh/H/ID1

Pattern	Male	Female	P value
Arch	1	4	0.05
Whorl	3	5	
Distal loop	52	76	
Proximal loop	2	5	
Tibial loop	15	10	
Vestiges	7	6	
Open fields	9	4	

Table II shows that patternonRtTh/H/ID1 in males and females was arch in 1 and 4, whorl in 3 and 5, distal loop in 52 and 76, proximal loop in 2 and 5, tibial loop in 15 and 10 and vestiges in 7 and 6 and open fields in 9 and 4 subjects respectively. The difference was significant (P< 0.05).

Table IIIAssessment of type of pattern on Rt ID2

Pattern	Male	Female	P value
Arch	0	0	0.04
Whorl	1	2	
Distal loop	12	6	
Proximal loop	20	70	
Tibial loop	2	13	
Vestiges	1	7	
Open fields	54	12	

Table II shows that patternonRt ID2 in males and females was whorl in 1 and 2, distal loop in 12 and 6, proximal loop in 20 and 70, tibial loop in 2 and 13, vestiges in 1 and 7 and open fields in 54 and 12 subjects respectively. The difference was significant (P< 0.05).

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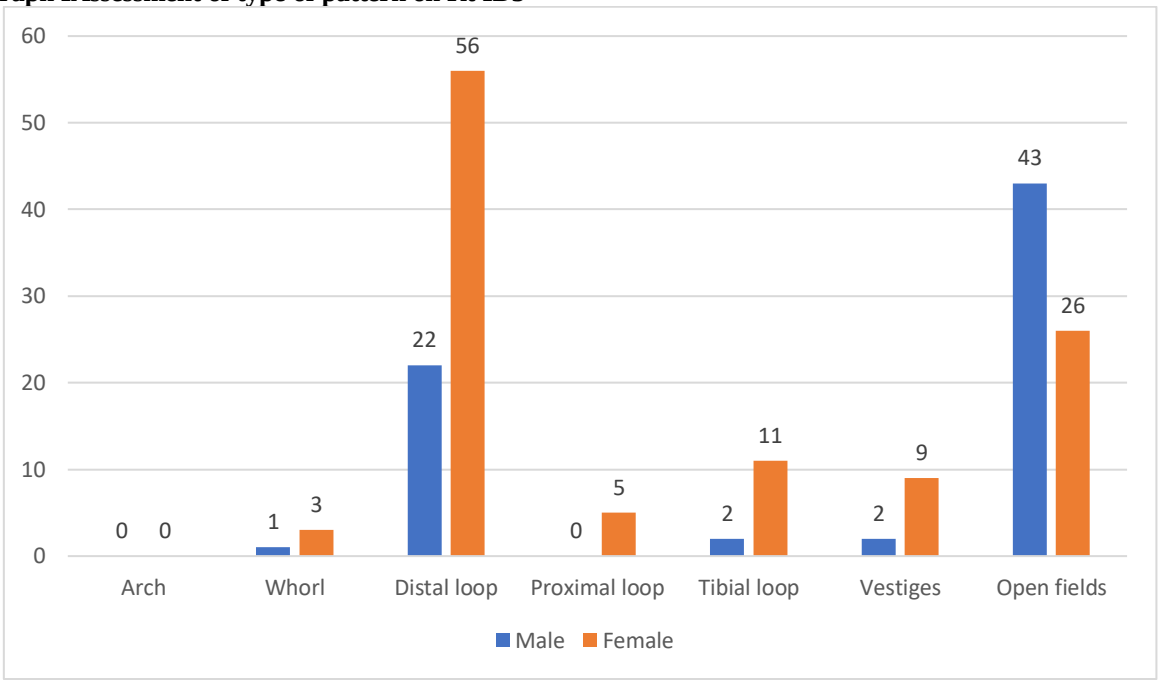
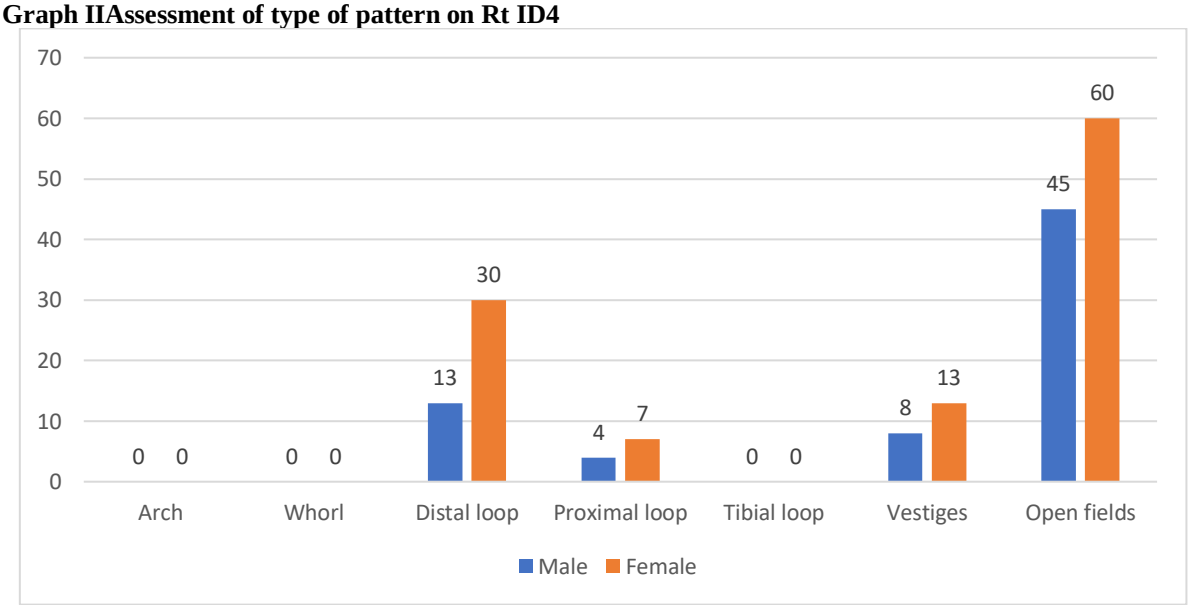
Graph IAssessment of type of pattern on Rt ID3



Graph I shows that patternonRt ID3 in males and females was whorl in 1 and 3, distal loop in 22 and 56, proximal loop in 0 and 5, tibial loop in 2 and 11, vestiges in 2 and 9 and open fields in 43 and 26 subjects respectively. The difference was significant (P< 0.05).

Graph IIAssessment of type of pattern on Rt ID4



Graph II shows that patterns on Rt ID4 in males and females was distal loop in 13 and 30, proximal loop in 4 and 7, vestiges in 8 and 13 and open fields in 45 and 60 subjects respectively. The difference was significant (P< 0.05).

DISCUSSION

In biological research, the patterns of the epidermal ridges on the palm and sole are very helpful.[8] Light microscopic sections of the epidermal ridge formation have been thoroughly examined.[9]With the solitary exception that each phase happens two or three weeks later, the development of the epidermal ridge patterns on the sole is thought to be identical to that on the palm.[10,11]The present study was conducted to assess right plantar dermatoglyphic configurations in study population.

We found that out of 200 subjects, males were 90 and females were 110.We found that patterns on RtTh/H/ID1 in males and females was arch in 1 and 4, whorl in 3 and 5, distal loop in 52 and 76, proximal loop in 2 and 5, tibial loop in 15 and 10 and vestiges in 7 and 6 and open fields in 9 and 4 subjects respectively. Ohriet al[12]studied and analysed the

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plantar dermatoglyphic patterns on the right sole of the individuals of Himachal Pradesh and to know its implication in gender determination. The sole dermatoglyphic prints of 400 individuals (200 males and 200 females) of the age group 18-45 years without any known medical conditions were analysed for the dermatoglyphic patterns visualised in the Hallucal/Thenar/First Interdigital Area (RtTh/H/ID1), Second Interdigital Area (Rt ID2), Third Interdigital Area (Rt ID3), FouthInterdigital Area (Rt ID4), Hypothenar Distal Area (Rt HTD), Hypothenar Proximal Area (Rt HTP) and the Calcar Area (Rt C) of the right sole. The mean age of the subjects included in the study was 29±4 years and 16±7 years for 200 males and 200 females, respectively. The study showed that there was indeed an association between the right plantar dermatoglyphic patterns and the sex of the people. The distribution of the dermatoglyphic patterns on RtTh/H/ID1 of the females were significantly different from the males.

We found that patterns on Rt ID2 in males and females was whorl in 1 and 2, distal loop in 12 and 6, proximal loop in 20 and 70, tibial loop in 2 and 13, vestiges in 1 and 7 and open fields in 54 and 12 subjects respectively. Aniboret al[13]determined asymmetry, complexity and pattern polarization of dermal ridges and palmar variables of atd angle, a - b ridge count and total finger ridge count of dermal ridges. 400 healthy students were studied. Ink prints of their fingers and palms were obtained. Counting and classifying of Palmar and digital ridge pattern configurations of arches, loops and whorls was based on standard techniques. Ulnar loops polarized preferentially to digits III, IV and V and radial loops to digit II. Female subjects had higher counts of radial loops ($p < 0.001$) than the males. Male subjects had a higher whorl count than the females

We found that patterns on Rt ID3 in males and females was whorl in 1 and 3, distal loop in 22 and 56, proximal loop in 0 and 5, tibial loop in 2 and 11, vestiges in 2 and 9 and open fields in 43 and 26 subjects respectively. We found that patternon Rt ID4 in males and females was distal loop in 13 and 30, proximal loop in 4 and 7, vestiges in 8 and 13 and open fields in 45 and 60 subjects respectively. Igbigbi et al[14] found that ulnar loops were the most prevalent digital ridge patterns and arches were the least in our samples with significant sex differences exhibited in arches, ulnar loops and whorls ($P < 0.05$). Similarly, men had significantly higher TFRC than women in Kenyans ($P < 0.001$), while Tanzanians showed no sex difference ($P < 0.5$). Women, however, had higher PII than men in Kenyans but the reverse was true in Tanzanians. In both groups, men showed significantly higher mean a-b ridge counts than women ($P < 0.001$, Kenyans; < 0.01, Tanzanians), and women showed greater mean atd angles than men ($P > 0.5$). The TFRC, atd angle and a-b ridge count were significantly different between Kenyans and Tanzanians.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that the male and female individuals differ significantly from one another. As such, the plantar dermatoglyphic patterns may be a valuable instrument in forensic and medico-legal contexts for determining an individual's gender.

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