

An Assessment of Dermatoglyphic Patterns in Primary and Secondary Amenorrhoea

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Abstract

The systematic study of the skin ridge patterns on the varied places such as fingers, toes, palms of the hands and soles of feet is so-called Dermatoglyphics. Although various dermatoglyph studies are reported in primary amenorrhoea from time to time with reference to numerous clinical and non-clinical conditions. There is a shortage of knowledge associated with study of dermatoglyphic patterns with reference to primary as well as secondary amenorrhoea. This present prospective study was designed to check at the same time finger and palmar dermatoglyphic patterns in amenorrhoea patients. An attempt was made to seek out whether or not a particular dermatoglyphic trait exists in amenorrhoea. Palmar and finger prints of patients with primary and secondary amenorrhoea were collected and qualitative analysis of fingertip patterns was carried out by recording whorls (simple vs. composite), loops (ulnar vs. radial) and arches (plain vs. tented). The Fingertip pattern was done by total finger ridge count. We observed a significant increase in fingertip pattern (whorl, arches, and loop), as well as total finger ridge count in primary amenorrhoea patient as compared to control. There was not any significant variation was seen in secondary amenorrhoea patients as compared to controls. This finding may be quite useful as a supportive investigation, and could be used in amenorrhoeic subjects for further referral for karyotyping and counseling in the Indian sub-continent furthermore as globally.

Keyword: Amenorrhoea; Dermatoglyph; Fingertip Patterns; Total Finger Ridge Count.

Introduction

The epidermal ridge configuration (dermatoglyph) and its component ridges enlarge with growth, however their essential characteristics are stable similar throughout life [1] and rely upon the distribution of epidermal ridges and dermal papillae, unique to the individual and vital as for identification [2]. Dermatoglyphics is used as a supportive diagnostic tool in genetic or

chromosomal disorders in addition as in clinical conditions with genetic disorders like Down's syndrome [3], Klinefelter's syndrome [4], and breast carcinoma [5]. Additionally to genetically determined, dermatoglyphs are influenced or changed by environmental factors [6]. Amenorrhoea or the absence of menstruation could be a symptom, not a wellness, and has a variety of causes since its occurrence is also connected with deviation from function of hypothalamus, pituitary gland, gonads and genital ducts [7]. In women, amenorrhoea is one amongst the major problems and it is the 6th major reason for female infertility [8,9]. Primary amenorrhoea is the absence of menstruation by 16 years of age with normal secondary sexual characters or no menstruation by the age of 14 years, with the absence of secondary sexual characters expression [10]. Patients with secondary amenorrhoea have had a minimum of one spontaneous bleeding episode followed by a minimum of 12 weeks absence of menstruation [11]. In India, solely a few studies are done on dermatoglyphs in amenorrhoea. Frequency of digital patterns, finger ridge counts and interdigital ridge counts, frequency of patterns in the thenar, hypothenar and interdigital areas and frequency of axial triradii were evaluated in 70 cases of primary

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Received | 25.10.2018, Accepted | 14.11.2018

amenorrhea perceive that there have been increased ulnar loops and arches, decreased ridge counts and increased number of accessory triradii along with elevation of axial triradii [12]. An assessment of correlation between 100 amenorrheic patients and 100 controls with normal karyotype had shown predominant arch pattern on the second finger, loop pattern on the fifth finger and whorl pattern on the fourth finger in addition as increased loop pattern with in the hypothenar area. There was a major difference within the patterns in the left first interdigital area between subjects with normal karyotype and controls, and in the patterns in the left second and third interdigital areas between subjects with abnormal karyotype and controls [2]. The current prospective study was designed to see whether or not any specific dermatoglyph features would emerge as marker in amenorrheic subjects.

Material and Method

Ethical clearance

The study was approved by the local research advisory committee of Jawaharlal Nehru Medical College, India. The study was carried out in the Department of Obstetrics and Gynaecology, Jawaharlal Nehru Medical College, Wardha, India, and performed in accordance with the Declaration of Helsinki. Detailed written consent of all the participants was taken in their local language along with detailed medical history before starting the procedure.

Participants

Females of age 16 to 25 years, attending the Obstetrics and Gynaecology OPD and admitted to the Obstetrics and Gynaecology wards participated to this study. The total number of amenorrhea subjects was 60, of which 40 had primary amenorrhea and 20 had secondary amenorrhea. Females resulted healthy (n=60), with normal menstrual cycle and normal clinical examination by specialist, were selected as controls. Females who were (a) before puberty (b) lactating, (c) with known chromosomal abnormalities were excluded from study.

All selected applicants were divided into following groups:

Group I - Healthy control individuals,

Group II - Individual's having amenorrhea (primary and secondary) Study protocol

As per guidelines by American Association of Dermatoglyphics [13], dermatoglyphic prints were

obtained by using ink [14]. Subjects were asked to clean both hands with soap and water to remove any oil or dirt, and dry with clean towel. The required amount of ink was placed over a glass inking slab and uniformly spread by means of a roller to get a thin, even film. Cleaned and dried palms of each subject were pressed from proximal to distal end over the inked slab. Care was taken to gently press between inter digital grooves at the roots of fingers as well as on the dorsum of thenar and hypothenar eminences. Right hand of the subject was then placed on the sheet of paper (kept over the pressure pad) from the proximal to distal end. The palm was gently pressed between interdigital grooves at the root of fingers and on the dorsum of thenar and hypothenar regions. The palm was then lifted from the paper in reverse order from the distal to proximal end. The finger tips were printed separately below the palmar print by rolled finger print method. The fingers were rolled from radial to ulnar side to include all the patterns. The same procedure was repeated for left hand using a separate sheet of paper. These printed sheets were coded with name, age, gender and study group of the subject. Detailed dermatoglyphic analyses of the prints were done with the help of magnifying hand lens. Ridge counting was done with a sharp needle. The details were noted on the same paper with lead pencil.

Parameters

The print of fingertip were taken by rolling the finger from radial to ulnar side and detailed were done with the help of magnifying lens. Qualitative analysis of fingertip patterns (Figure 1A to C) was done by examine whorls (simple vs. composite), loops (ulnar vs. radial), and arches (plain vs. tented). Quantitative analysis of fingertip patterns was done by total finger ridge count (TRFC) and this TRFC is the sum of ridge counts of all ten digits, and only the larger count was used on those digits with having more than one ridge count. It states size of pattern.

Statistical Analysis

Quantitative data are expressed as mean. Association among the study groups was assessed with the help of chi-square test by using statistical software SPSS Version 17.00 and $p \leq 0.05$ was taken as significant.

Results

Fingertip Patterns

The data for the right and left hands and for the different groups of subjects are summarized in

(Tables 1). We observed that whorls and arches were significantly more frequent in primary amenorrhea patients as compared to control individuals. Conversely, loops (radial and ulnar) were significantly more numerous in primary amenorrhea patients as compared to control individuals. In cases of secondary amenorrhea there were no significant differences in the fingertip pattern (whorls, arches and loops) when compared to control.

Total Finger Ridge Count

The data are summarized in (Figures 2 and 3). We observed that there were significantly higher counts in either hand and in both hand together of primary amenorrhea patients as compared to control individuals. On the contrary, there was no significant difference for any count between patients with secondary amenorrhea and controls.

Table 1: Percent frequency of fingertip pattern (for both right and left hand) in primary and secondary amenorrhea patients and control individuals.

Pattern	Control (n=40)			Primary amenorrhea (n=40)			Secondary amenorrhea (n=20)		
	Right (%)	Left (%)	Mean (%)	Right (%)	Left (%)	Mean (%)	Right (%)	Left (%)	Mean (%)
Whorls	23.5±2.3	26.0±2.6	24.75±2.45	35.0±3.0*	38.5±3.5*	36.75±3.25*	26.0±3.7	24.0±3.5	25.0±3.6
Arches	11.0±1.5	6.5±0.83	8.75±1.16	15.5±1.8*	11.5±1.3*	13.5±1.55*	10.5±1.20	6.5±1.32	8.5±1.26
Ulnar Loops	53.0±6.7	54.5±4.2	53.75±5.45	62.5±5.5	60.5±6.3	61.5±5.9*	54.0±3.6	55.0±1.7	54.5±2.65
Radial Loops	1.0±0.03	0.50±0.01	0.75±0.02	3.5±0.80	4.0±1.1	3.75±0.95*	1.0±0.94	0.60±0.55	0.80±0.74

*Significant at the level of $p \leq 0.05$



Fig. 1A: Arch pattern



Fig. 1B: Loop pattern

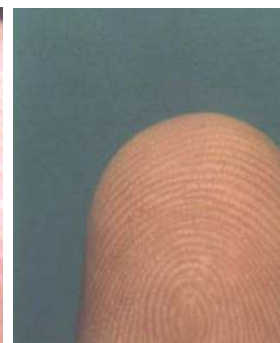


Fig. 1C: Whorl pattern

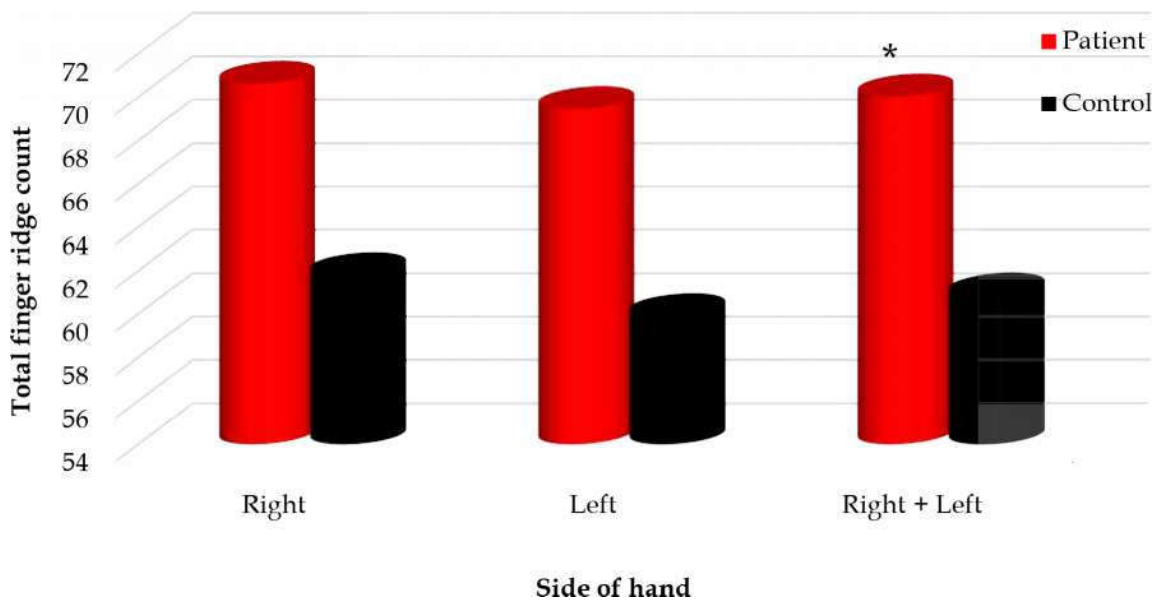


Fig. 2: Total finger ridge count (TFRC) of right hand, left hand and both together (right and left) hand in primary ammenorrheapaitents and control. * Significant at the level of $p \leq 0.05$

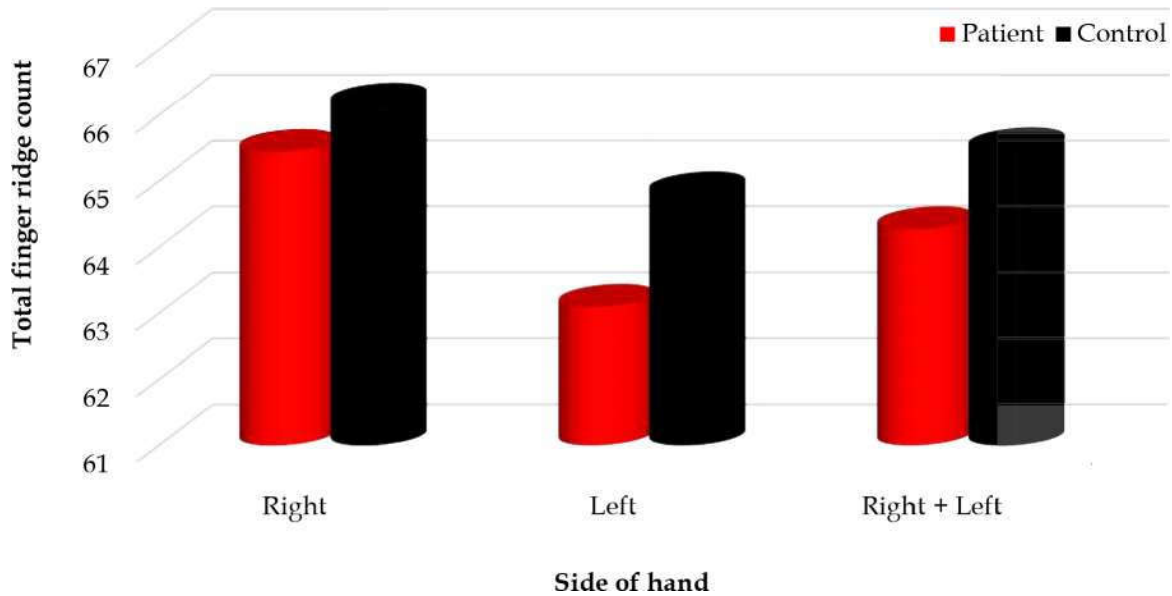


Fig. 3: Total finger ridge count (TFRC) of right hand, left hand as well as both together (right and left) hand in secondary amenorrhea patients and control. No difference was significant

Discussion

Dermatoglyphics is that the systematic study of the skin ridge patterns on the various places like fingers, toes, palms of the hands and soles of feet. In the present study, the finger dermatoglyphic patterns were studied in primary and secondary amenorrhea to find out whether or not a particular dermatoglyphic trait exists in amenorrhea condition and whether or not it is statistically significant. Features that may well be applied as markers for amenorrhea were the presence of arch pattern in the 2nd left finger, loop pattern on the 5th right finger, hypothenar pattern within the left palm and sydney line in the 1st inter digital area of the left palm [2]. We observed a considerably higher total finger ridge count in either hand or both hand together of subjects with primary amenorrhea. This finding is analogous to a previous one, in which additionally some abnormal karyo types were found in primary amenorrhea. However, finger ridge count and frequency of total arches, radial and ulnar loops and whorls in the previous study were not significantly different between subjects with amenorrhea and controls [15]. In another study, there was significant increase in frequency of arches on the left second finger in patients of primary amenorrhea as compared to control [2]. We have got additionally discovered that arches on each left and right side of finger in the patients of primary amenorrhea was significantly higher, when

compared to control individuals. The number and frequency percentage of whorl was significantly increased on both left and right sides of finger in patients with primary amenorrhea as compared to control individuals. This correlates with a previous finding in patients of primary amenorrhea [16]. Moreover the incidence of arches in secondary amenorrhea patients and controls was found to be statistically non-significant in the present study. A previous study had observed that the number and frequency percentage of radial as well as ulnar loops was significantly increased on the right side, typically on the fifth finger, in the patients of primary amenorrhea as compared to controls [2]. This finding is similar with observations in the present study, in which the number and frequency percentage of radial loops as well as ulnar loops is found to be significantly increased in both right sides as well as left side in patients of primary amenorrhea as compared to controls. However, in patients of secondary amenorrhea radial loop as well as ulnar loops pattern is found to be statistically non-significant, when compared to control. We have discovered that TFRC was increased considerably in patients of primary amenorrhea as compared to controls, while in cases of secondary amenorrhea no significant differences were found from controls. This finding is parallel to previous finding within which total finger ridge count in each hands (right and left) was increased significantly in patients of primary amenorrhea when compared to control [16].

Limitation of the Study

Karyotyping has not been performed because of lack of funding. However to assign a statistical significance to any observation concerning karyotype a much larger number of samples would be required.

Conclusion

Although numerous dermatoglyphic studies have been reported from time to time with relevance to various clinical and non-clinical conditions. However, there is shortage of information on dermatoglyphic patterns in each primary and secondary amenorrhea within the Indian sub-continent further more as globally. The most important finding in the present study was a significant increase in fingertip pattern (whorl, arches, and loop), and total finger ridge count in primary amenorrhoea patient as compared to controls. There was no significant variation in secondary amenorrhea patients as compared to controls. This finding may be quite useful as a supportive investigation, and will be employed in amenorrhoeic subjects for additional referral for counseling.

Acknowledgement

We tend to appreciatively acknowledge the Department of Anatomy, Jawaharlal Nehru Medical College, Wardha, India, for providing financial support.

Conflict of Interest

The authors declared no conflict of interest.

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