

Dermatoglyphics-Quantitative Analysis in Rheumatoid Arthritis

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ABSTRACT Various studies have shown dermatoglyphics as a possible marker and a tool to detect Rheumatoid arthritis. In the present study, quantitative, dermatoglyphic features comprising of 'total finger ridge count', absolute finger ridge count' and 'a-b ridge count' was done on 11 males and 25 females in both hands and compared with equal number of controls. A trend towards significance was observed in right hand of male patients with respect to 'Total finger ridge count' (Patient 56.09 ± 26.22 , Control 35.36 ± 8.9 , $p = 0.0873$, $n = 11$). On the other hand, female patients showed significance for the right hand for 'Absolute finger ridge count' (Patient = 99 ± 43.75 , Control 93.5 ± 42.05 , $p = 0.0358$, $n = 22$) and in the left hand for the male patients (Patient = 94.27 ± 37.58 , Control = 94.27 ± 28.56 , $p = 0.0358$, $n = 11$). Significant values were found in the in left hand for female (Patient 39.2 ± 6.85 , Control 38.08 ± 5.07 , $p = 0.0437$, $n = 11$) and right hand of male patients for 'a-b ridge count' (Patient = 73.64 ± 20.32 , Control 38.64 ± 4.10 , $p = 0.0002$, $n = 11$). The observations of the present study, has suggested, that 'a-d' ridge count could be considered as marker for male as well as female patients as the diagnostic tool in linking the rheumatoid arthritis to dermatoglyphics. Further studies are needed on a large scale to confirm.

INTRODUCTION

The proposed factors governing the pathogenesis of rheumatoid arthritis (RA) are numerous; genetic and multifactorial being included amongst them (Holt, 1973; Schaumann and Alter, 1976). Dermatoglyphics, the study of epidermal ridges on palm and sole, is also supposed to be influenced by the genetic as well as the multifactorial causes. Dermatoglyphics study usually includes the following parameters: Quantitative: total finger ridge count, absolute finger ridge count, a-b ridge count, Main-line formula and Qualitative: percentage occurrence of the finger print patterns, simian crease, patterns in hypothenar and interdigital areas.

Dermatoglyphics as markers in single gene disorders, chromosomal abnormality and multifactorial conditions, is a well-known entity. To name a few are Down syndrome, Turner syndrome, congenital heart defects, hypertension and Epilepsy. The common factors governing

rheumatoid arthritis and dermatoglyphics may enable dermatoglyphics as a marker tool in rheumatoid arthritis. The study available in literature in India, associating rheumatoid arthritis to dermatoglyphics is by Taneja et al. (1993).

Hence, the present investigation has been undertaken to find out the correlation between the quantitative dermatoglyphics and rheumatoid arthritis.

MATERIAL AND METHOD

Patients diagnosed in Department of Orthopedics, confirmed as having rheumatoid arthritis were referred to Division of Human Genetics for counseling. Patients were composed of 25 females (26-70 years) and 11 males (18-54 years). Controls were of similar number, aged between 45-84 years in females and 40-75 years in males. It may be noted that, for any study on dermatoglyphics, age similarity may not be required. Dermatoglyphics, once formed usually do not change; until and unless affected because of occupational hazards.

Modified Purvis-Smith' (1969) printing method was used to obtain the dermatoglyphics prints. Printer ink smeared on clean and dry hands was printed on bond paper using a roller. Quanti-

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tative dermatoglyphic parameters comprising of 'Total finger ridge count' (TFRC) 'Absolute finger ridge count' (AFRC) and 'a-b ridge count' were studied on both hands together and separately. The criteria for selecting the above mentioned parameters are the feasibility of studying them with ease and the effective utilization of time and labor. Statistical analysis was done using student 't' test.

RESULTS

A trend towards significance was observed in right hand of male patients with respect to 'Total finger ridge count' (Patient 56.09 ± 26.22 , Control 35.36 ± 8.9 , $p=0.0873$, $n=11$) (Table 1).

Table 1. Total finger ridge count – rheumatoid arthritis.

	Left (n=25) M $\pm$ SD	Right (n=22) M $\pm$ SD
<i>Female:</i>		
Patient	61.04 $\pm$ 24.80	72.59 $\pm$ 19.59
Control	65.58 $\pm$ 23.86	71.23 $\pm$ 25.76
p	0.4795 NS	0.8243 NS
	Left (n=11)	Right (n=11)
<i>Male:</i>		
Patient	54 $\pm$ 29.07	56.09 $\pm$ 26.22
Control	71.27 $\pm$ 14.57	35.36 $\pm$ 8.79
p	0.1335 NS	0.0873 Trend to S

S: significance, NS: non-significance.

Table 2. 'Absolute finger ridge count' – rheumatoid arthritis.

	Left (n=25) M $\pm$ SD	Right (n=25) M $\pm$ SD
<i>Female:</i>		
Patient	82.28 $\pm$ 42.71	99 $\pm$ 43.75
Control	88.2 $\pm$ 43.87	93.5 $\pm$ 42.05
p	0.6463 NS	0.0358 S
	Left (n=11)	Right (n=11)
<i>Male:</i>		
Patient	94.27 $\pm$ 37.58	78.27 $\pm$ 44.20
Control	94.27 $\pm$ 28.56	95.73 $\pm$ 37.18
p	0.0358 S	0.3404 NS

Table 3. 'a-b ridge count' – rheumatoid arthritis.

	Left (n=25) M $\pm$ SD	Right (n=22) M $\pm$ SD
<i>Female:</i>		
Patient	39.2 $\pm$ 6.85	38.5 $\pm$ 6.32
Control	38.08 $\pm$ 5.07	36.58 $\pm$ 4.73
p	0.0437 S	0.1779 NS
	Left (n=11) M $\pm$ SD	Right (n=11) M $\pm$ SD
<i>Male:</i>		
Patient	39.36 $\pm$ 6.81	73.64 $\pm$ 20.32
Control	40.36 $\pm$ 5.28	38.64 $\pm$ 4.10
p	0.7453 NS	0.0002 S

On the other hand, female patients showed significance for the right hand for 'Absolute finger ridge count' (Patient=99 $\pm$ 43.75, Control 93.5 $\pm$ 42.05, $p=0.0358$, $n=22$) and in the left hand for the male patients (Patient=94.27 $\pm$ 37.58, Control = 94.27 $\pm$ 28.56, $p=0.0358$, $n=11$) (Table 2).

Significant values were found in the in left hand for female (Patient 39.2 $\pm$ 6.85, Control 38.08 $\pm$ 5.07, $p=0.0437$, $n=11$) and right hand of male patients for 'a-b ridge count' (Patient=73.64 $\pm$ 20.32, Control 38.64 $\pm$ 4.10, $p=0.0002$, $n=11$) (Table 3).

DISCUSSION

Abnormalities in the growth process, which are liable to distort the alignment of dermal ridges, may result from the action of abnormal genes, chromosomal aberrations, even from poisoning by a drug, or from a viral infection. In some cases the cause remains unknown Holt (1973). The characteristic patterns in an individual that deviate from the norm must be caused by the changes occurring before the completion of the fourth fetal month. Since epidermal ridge patterns form early in fetal development and remain unchanged throughout life, unusual dermatoglyphics may indicate gene or chromosomal abnormalities consistent with a disease such as rheumatoid arthritis.

In this study, male patients showed a trend towards significance for 'total finger ridge count', significance in left hand for 'absolute finger ridge count', and in the right for 'a-b ridge count'. On the other hand, in the female patients, 'absolute finger ridge count' was found to be significant for right hand and 'a-b ridge count' for left hand (Tables 1, 2, 3).

One of the published reports in India on dermatoglyphics in rheumatoid arthritis did not observe any difference between patients and controls for the total finger ridge count and the a-b ridge count (Taneja et al., 1993).

The observed differences between the male and female patients as well as with that of the control may be because of the increased whorl pattern adding to two counts and the width of the palm and fingers, thereby more number of ridges may be present. Of course, the technicality of spreading the fingers and the palm, also have to be kept in mind.

It could be inferred from the present study that characteristic variations in dermatoglyphics pattern are present in rheumatoid arthritis.

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