

## **Dermatoglyphics in Patients of Schizophrenia in Kashmiri Population. A Comparative Study**

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**Background:** It is believed that the combination of genetic and environmental factors plays important role in development of schizophrenia. Many structures of the body like the brain, lips, alveoli, etc. develop during the same period as the finger ridges. An abnormal developmental insult on these structures in uterus is likely to be reflected in the dermatoglyphic patterns.

**Aims:** Study the finger and palm dermatoglyphic pattern of schizophrenic patients for quantitative as well as qualitative features and compare with the normal persons.

**Material and methods:** A total of 200 subjects were used for the study. Out of 200 subjects, 100 were taken as cases and 100 as controls. Palmar and fingerprint patterns of both hands were taken and analyzed of all participants of two groups. The parameters studied were finger ridge pattern, palmar pattern of interdigital areas, a-b ridge count, TFRC, palmar creases, atd angle and adt angle.

**Results:** Frequency of mean pattern of arches were less and statistically significant in schizophrenia patients when compared to controls. The frequency of mean pattern of whorls was higher and statistically significant in schizophrenia patients when compared to controls. Statistically non-significant differences were seen in frequency and palmar patterns of I2, I3, I4 and hypothenar areas (I5) in schizophrenia patients when compared to controls. The results revealed statistically significant differences regarding the frequency of different types of palmar creases in schizophrenia patients when compared to controls. The mean values of 'atd' and 'adt' angles were higher and statistically significant in schizophrenia patients when compared to controls. Frequency of AB ridge count was seen lower and statistically significant in schizophrenia patients when compared to controls. TFRC were higher and statistically significant in schizophrenia patients when compared to controls.

**Conclusion:** Dermatoglyphics is a promising method to study schizophrenia. Dermatoglyphics being an unique and cost effective method can be used for identification of such psychiatric disorder for an early diagnosis, treatment and better prevention whose etiology may be influenced directly or indirectly by genetic inheritance.

**Key words:** Dermatoglyphics, Schizophrenia, Quantitative and Qualitative parameters.

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### **I. Introduction**

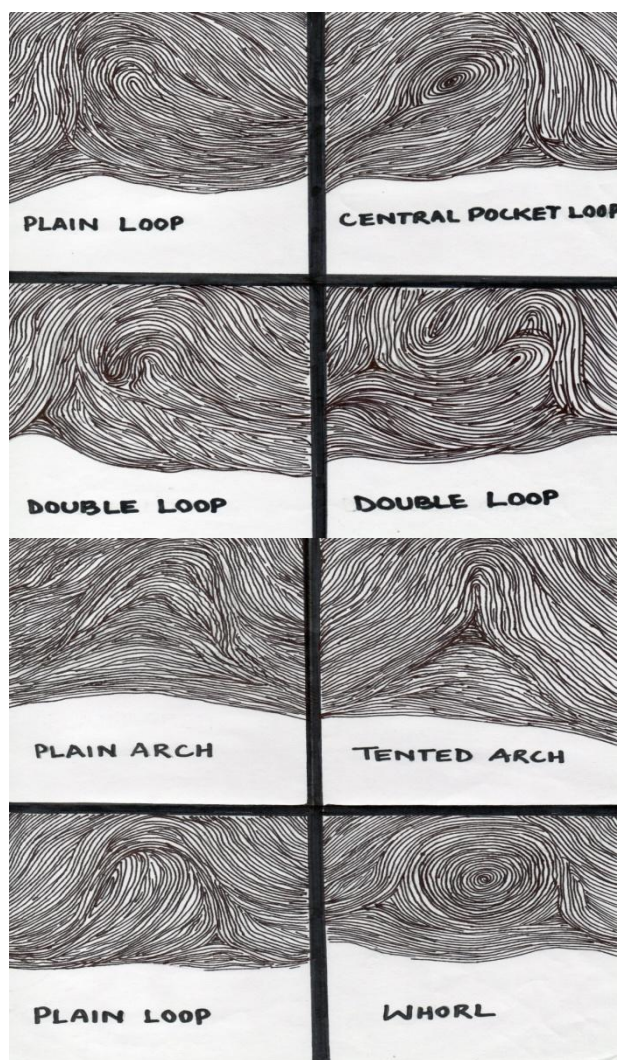
Dermatoglyphics is the study of the patterns of skin ridges (epidermal ridges) present on the human fingers, palms, toes and the soles. <sup>[1]</sup> Dermatoglyphics, as a means of identification has been used by man from ancient times, but use of dermatoglyphic features in the diagnosis of various diseases has received attention from 17th century. Dermatoglyphics plays an important role in the diagnosis of chromosomal disorders and other diseases which have genetic background. Since dermal ridges develop during 6th-13th weeks of gestation, genetic message carried in the genome - normal or abnormal - is deciphered during this period and is reflected in dermatoglyphics. Many structures of the body like the brain, mammary glands, lips, alveoli, palate etc. develop during the same period as the finger ridges. An abnormal developmental insult on these structures in uterus is likely to be reflected in the dermatoglyphic patterns.

The present study was designed to highlight the significance of dermatoglyphics in schizophrenia patients. The primary aim of the study was to compare the finger and palm prints of schizophrenia patients with those of the normal population for quantitative as well as qualitative features.

### **II. Material And Methods**

This study was carried out in Department of Anatomy, Government Medical College, Srinagar. The study was designed to collect the dermatoglyphic pattern of the known cases of schizophrenia patients and compare with normal healthy subjects. This study consisted of 200 subjects and these were divided into two equal groups, 100 subjects in each group as follows:-

**Group S (Schizophrenia Group):** this group consisted of 100 diagnosed cases of Schizophrenia patients based on the diagnostic and statistical manual of mental disorders (DSM) <sup>[2]</sup> diagnostic criteria. **Group C (control group):** this group consisted of 100 normal persons, selected randomly from general population with no psychiatric disorders in them or in their family. Patients suffering from eczema, leprosy, chronic dermatitis, scars due to trauma on fingers were excluded from study. The palmar and finger imprint was taken by standard ink method. <sup>[3]</sup> Two **types of parameters were studied:-quantitative** (mean a-b ridge count, a-t-d angle, a-d-t angle, total finger ridge count) and **qualitative** (finger ridge patterns: can be loops, whorls, arches, palmar flexion creases type)



(Figure 1: Different types of Dermatoglyphics Pattern)

### III. Results

Schizophrenia patients consisted of 60 males and 40 females. The control group consisted of 55 males and 45 females. Statistically there were non-significant difference between the two groups regarding the sex and mean age in years ( $P > 0.05$ ). When compared the qualitative and quantitative dermatoglyphic pattern of two groups, our study revealed following results:-

- The results of the study revealed statistically non-significant differences in mean pattern of ulnar and radial loops between schizophrenia patients and controls (table 2).
- The study revealed statistically significant and decreased frequency of mean pattern of arches in schizophrenia patients when compared to controls (table 2).
- In the present study, mean pattern of whorls were higher and statistically significant in schizophrenia patients when compared to controls (table 2).
- The present study revealed statistically non-significant differences in frequency and palmar patterns of I2, I3, I4 and hypothenar area (I5) between schizophrenia patients and controls.

- Regarding the palmar crease types, the closed type palmar crease was commonest type and open palmar crease was least seen in schizophrenia patients and controls. The results revealed statistically significant differences when comparing the different types of palmar creases in schizophrenia patients when comparing to controls.
- In our study it was found that the values of mean 'atd' angle were higher and statistically significant in schizophrenia patients when compared to controls (table 1).
- It was also found that the mean values of 'adt' angle in schizophrenia patients were higher and statistically significant when compared to controls (table 1).
- Our study has shown significant and lower values of mean frequency of AB ridge count in schizophrenia patients when compared to controls (table 1).
- TFRC in our study was higher in schizophrenia patients and statistically significant when compared the TFRC of controls (table 1).

**Table1: Qualitative dermatoglyphic patterns of two study Groups.**

| Pattern                      | Group | Mean   | Std. Deviation | P-Value  | Result |
|------------------------------|-------|--------|----------------|----------|--------|
| AB ridge count in both hands | S     | 40.09  | 4.74           | <0.0001* | S      |
|                              | C     | 43.99  | 4.31           |          |        |
| Total TFRC in both hands     | S     | 139.65 | 32.10          | 0.0236*  | S      |
|                              | C     | 128.73 | 35.50          |          |        |
| Mean ate angle of both hands | S     | 43.99  | 4.81           | <0.0001* | S      |
|                              | C     | 40.09  | 4.73           |          |        |
| Mean adt angle of both hands | S     | 79.90  | 5.70           | <0.0001* | S      |
|                              | C     | 73.32  | 5.47           |          |        |

Values are expressed in mean and standard deviation, S=Significant,\* p -value between Group S and Group C. TFRC= Total finger ridge count

#### IV. Discussion

Dermatoglyphics is the science which deals with the study of dermal ridge configuration on the digits, palms and soles. <sup>[1]</sup> Dermatoglyphic patterns are genetically determined. Abnormality in the genetic configurations of parents is inherited to children and is reflected in the dermatoglyphic pattern. Hence dermatoglyphic study proves to be very useful, easily applicable, inexpensive and indispensable marker tool in the diagnosis of hereditary diseases. <sup>[1, 4]</sup> Schizophrenia is a common psychiatric illness with high levels of morbidity and mortality. The recent evidence from adoption, twin and family studies have proved a basis for the genetic contributions in Schizophrenia. <sup>[5, 6]</sup> Hence, the present study was undertaken to determine the significant dermatoglyphic patterns applicable to schizophrenia which can serve to strengthen the diagnosis of this common psychiatric disease. The primary aim of the study was to compare the finger and palm prints of schizophrenia patients with those of the normal population sample for quantitative as well as qualitative features.

**Table 2: Quantitative dermatoglyphic pattern (right and left hand) of two study groups summed over ten fingers**

| Pattern                     | Group | Mean | SD   | P value | Result |
|-----------------------------|-------|------|------|---------|--------|
| Radial loops in both hands  | S     | 0.28 | 0.55 | 0.1433* | NS     |
|                             | C     | 0.43 | 0.86 |         |        |
| Arches in both hands        | S     | 0.25 | 0.69 | 0.0127* | S      |
|                             | C     | 0.48 | 0.60 |         |        |
| Ulnar loops in both hands.  | S     | 2.26 | 1.54 | 0.999*  | NS     |
|                             | C     | 2.81 | 2.33 |         |        |
| Simple whorls in both hands | S     | 4.57 | 2.26 | 0.002*  | S      |
|                             | C     | 3.37 | 2.28 |         |        |

Values are expressed in mean and standard deviation, NS=non-significant, S= Significant,\* p -value between Group S and Group C.

#### Arches

In the present study frequency of arches has been found to be decreased in schizophrenia patients, this difference is statistically significant when compared to controls (P <0.05). Mean finger print pattern score of arches summed over both right and left hand fingers were also low in schizophrenia patients (0.25±0.69) as compared to controls (0.48±0.62). Sunita U. et al. <sup>[7]</sup> also found decreased frequency of arches in schizophrenia patients when compared to controls. Sowjanya et al. <sup>[8]</sup> in a comparative study also found decreased frequency of arches in male and female schizophrenia patients when compared to controls.

### **Ulnar loops**

In the present study, mean pattern of ulnar loops in both right and left hands were lower in schizophrenia ( $2.59 \pm 1.54$ ) patients when compared to controls ( $2.41 \pm 2.33$ ). But the differences were statistically non-significant ( $p > 0.05$ ). Sunita U. et al.<sup>[7]</sup> also found slightly decreased frequency of ulnar loops in schizophrenia patients when compared to controls. Sowjanya et al.<sup>[8]</sup> in a comparative study also found decreased frequency of ulnar loops in male and female schizophrenia patients when compared to controls.

### **Radial Loops**

The mean pattern of radial loops in both right and left hands was seen highest in schizophrenia patients ( $0.28 \pm 0.55$ ) when compared to controls ( $0.43 \pm 0.86$ ), but the differences were statistically non-significant ( $p > 0.05$ ). This finding agrees with Sunita and co-workers<sup>[7]</sup> who reported slightly increased frequency of radial loops in male schizophrenia patients when compared to controls but statistically non-significant. Sowjanya et al.<sup>[8]</sup> in a comparative study also found non-significant differences in frequency of radial loops in male and female schizophrenia patients when compared to controls. Uday N. et al.<sup>[9]</sup> in a study of male and female schizophrenia also reported increase frequency of radial loops in cases as compared to controls.

### **Whorls**

In our study, whorls were the second most common pattern after ulnar loops. The mean patterns of whorls in both right and left hands were higher and statistically significantly in schizophrenia patients ( $3.63 \pm 2.20$ ) when compared to controls ( $4.31 \pm 2.34$ ). Sowjanya et al.<sup>[8]</sup> in a comparative study also found increased frequency of whorls in male and female schizophrenia patients when compared to controls. This finding agrees with Sunita et al.<sup>[7]</sup> and Suwana Arunpongpaial et al.<sup>[10]</sup> who reported significantly increased frequency of whorls in schizophrenia patients as compared to controls. Our study also correlates with the study of Uday et al.<sup>[9]</sup> who reported statistically significant increased frequency of whorls female schizophrenia patients as compared to female controls.

### **Palmar Pattern**

The commonest palmar pattern seen in our study was arches followed by loops and whorls both in right and left hands in schizophrenia patients as well in controls. The percentage frequency of presence of patterns in interossi area-2 and hypothenar areas were lower in schizophrenia patients as compared to that of controls, but the differences were statistically non-significant. The palmar pattern in interossi area 4 shows higher percentage frequency of patterns in schizophrenia patients as compared to that of controls. But these differences were not statistically significant. Our study was consistent with the observations of the study of Sunita et al.<sup>[7]</sup> who in a study of 50 male schizophrenia and reported same results. These findings are also in perfect agreement with Rosner and Steinberg<sup>[11]</sup>, Bechman and Noring<sup>[12]</sup> who found an increase in interossi area 4 pattern frequencies in schizophrenia patients as compared to controls

### **Palmar Angles**

In the present study, values of palmar angles (atd angle and adt angle) of both palms were significantly higher in schizophrenia patients as compared to control group. These difference are statistically significant in right as well as significant in left hand ( $p < 0.05$ ). These findings are very much similar to that of Sunita U. et al.<sup>[7]</sup> and Mellor C.S<sup>[13]</sup> who found significant ( $p < 0.05$ ) increase in 'atd angles of male and female schizophrenia patients as compared to control group. Asma and co-workers<sup>[14]</sup> in their comparative study also found significantly higher atd angle in schizophrenia patients as compared to controls.

### **a-b ridge count**

In our study the mean a-b ridge count of right and left hands were lower in schizophrenia patient as compared to controls. Asma and co-workers<sup>[14]</sup> and Shana Golemo-Smith et al.<sup>[15]</sup> in a dermatoglyphics study in schizophrenia patients also reported decreased frequency of a-b ridge count in schizophrenia patients. E. Bramon and co-workers<sup>[16]</sup> in a meta- analysis study on a-b ridge count in schizophrenia patients confirmed mild a-b ridge count reduction in schizophrenia patients compared to controls.

### **TFRC**

In this study mean TFRC of right hand and left hand were found significantly higher in schizophrenia patients when compared to controls. These difference were statistically significant in right hand as well as significant in left hand when compared to mean TFRC of control group ( $> 0.05$ ). Asma and co-workers<sup>[14]</sup> and Jelovac et al.<sup>[17]</sup> also observed increased frequency of total finger ridge count in male Schizophrenia patients when compared to male controls as shown by our study. Similarly our results also correlate with study of Sivkov

S. et al. [18] who reported statistically significant increase in frequency of TFRC in right hand and left hand in schizophrenia patients.

## V. Conclusion

This study attempts to analyse, whether there exists any specific pattern of dermatoglyphics in schizophrenia and whether that serves as a diagnostic tool for early diagnosis of schizophrenia. Arch patterns are significantly reduced in finger tips of schizophrenia with no significant differences in mean counts of ulnar and radial loops. The whorl patterns are significantly increased in finger tips of schizophrenia. The 'atd' angle is significantly increased in schizophrenia while a-b ridge count is significantly lower in schizophrenia. TFRC count is increased in schizophrenia. Thus, though there are some advantages of dermatoglyphic traits as a diagnostic tool, it has its own limitations when used alone in an individual case. However, when it is combined with other clinical features it will play an important role in diagnosis of medical disorders.

## References

- [1]. Ramani P, Abhilash PR, Sherlin HJ et al. Conventional Dermatoglyphics: A Review. *International Journal of Pharma and Bio Sciences* 2011; 2(3): 446-458.
- [2]. Hersen, Michel, Rosqvist, Johan (2008). *Handbook of Psychological Assessment, Case Conceptualization, and Treatment, Volume 1: Adults*. John Wiley & Sons. p. 32.
- [3]. Schaumann B and Alter M. *Dermatoglyphics in medical disorders*. New York: Springer Verlag 1976: 187-189.
- [4]. Holt, S. B. (1968). *The genetics of dermal ridges*. Charles Thomas, Springfield III.
- [5]. Tsuang MT, Taylor L, Faraone SV. An overview of the genetics of psychotic mood disorders. *J Psychiatr Res.* 2004;38:3-15.
- [6]. Aa Kessler R.C et al. Prevalence, severity and co-morbidity of 12-Month DSM-IV disorders in the National Co-morbidity Survey Replication. *Arch Gen psychiatry* 2005; 62:617-627
- [7]. Sunita U, Sawant, sunil M, Kolekar, P. Jyoti . *Dermatoglyphics in male patients with Schizophrenia*. *International Journal of Recent Trends in Science and Technology*, 2013; 6: 109-114.
- [8]. Sowjanya, S.Viveka, V.Viswambhar, M.J Sudha. *Finger tip pattern in schizophrenic patients: a dermatoglyphics study*. *International J of Scientific Study* 2015; 2:44-50
- [9]. Uday N. Kudalkar, N. R. Madhale. *Dermatoglyphic patterns in schizophrenia*. *JEBMH* 2016; 3: 8: 231-234.
- [10]. Suwanna Arunpongpaisal, Paiboon Mongconthawornchai, Surapol Virasiri, Somchit Maneeganondh, Kaewchai Thepsuthummarat . *A Matching Case-Control Study*. *J Med Assoc Thai* 2011; 94 (3): 386-94.
- [11]. Rosner F and Steinberg F S. *Dermatoglyphic patterns of Negro men with schizophrenia*. *Disease of the N. System*, 1968; 29 : 739.
- [12]. Lucas B. J. and Lehrenbecher W. *Dermatoglyphics in Schizophrenia*. *Brit. J. Psychiatry* 1969; 115: 1347.
- [13]. Mellor C. S. *Dermatoglyphics in Schizophrenia*. *Brit. J. Psychiatry* 1968; 114: 1387 - 1390.
- [14]. Ashma A. Latiff, Sundarapandian S, Arul Saravanan R. *A comparative study of dermatoglyphic markers in schizophrenia patients and normal controls*. *International Journal of Research in Medical Sciences*. 2017; 5(6):2558-2562.
- [15]. Shana Golembo-Smith, Deborah J. Walder and Jason Schiffman. "The Presentation of Dermatoglyphic Abnormalities in Schizophrenia: A Meta-Analytic Review". *Schizophrenia Research* 2012;142:1-3
- [16]. E Bramon, M Walshe, C McDonald , B Martin , T Touloupoulou , H Wickham , J van Os , P Fearon, P Sham, L Fananas, R M Murray . "Dermatoglyphics and schizophrenia: A meta-analysis and investigation of the impact of obstetric complications upon a-b ridge count". *Schizophrenia Research* 2005; 75 :399-404.
- [17]. N. Jelovac, J.Milicic, M.Milas, G.Dodig, S.Turek, And Z.Ugrenovic. *Dermatoglyphic analysis in bipolar affective disorder and schizophrenia*.*Coll Antropol*.1999;23;2:589-595
- [18]. Sivkov S. and Akabaliev V. *Dermatoglyphics in Schizophrenia: qualitative aspects*. *Folia Med.* 1998; 40(3): 44-50.

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