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VARIATIONS OF DERMATOGLYPHIC PARAMETERS IN RESPECT TO MALE AND FEMALE PATIENTS OF SCHIZOPHRENIA IN WEST BENGAL POPULATION.

Anatomy

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ABSTRACT

Palmar Dermatoglyphics amongst Schizophrenics has had been a study with immense potential in recent times.So it is imperative to undertake such a study among the Indian Schizophrenics.In this study, examination of some dermatoglyphic features was undertaken in a Case-control study among Schizophrenic male and female patients from the state of West Bengal for a period of 1yr.Total 58 Schizophrenia patients (30males and 28 females) and 50 sex-matched control group (25males and 25females) were selected & the following dermatoglyphic parameters were taken into account-Ridge counts and Total finger ridge counts,Absolute total finger ridge count,a-b ridge count.In our present study,the mean total finger ridge count show statistically significant increase in male schizophrenics than female patients.Regarding the Absolute finger ridge count, we found sexual differences but they are also not statistically significant.It was also noted that the male schizophrenics show significantly higher mean a-b ridge count than female schizophrenics.Results from the present study can be useful in population genetics.

KEYWORDS

Dermatoglyphics,Schizophrenia,Ridge Count

INTRODUCTION:

In the last few decades quite a large number of congenital and hereditary diseases are being investigated for dermatoglyphic markers. Researchers of the different part of the globe have also shown a large number of behavioral abnormalities to be associated with typical dermatoglyphic characteristics. In the year 1977 J. Mavalwala [1] from Paris lists an extensive bibliography on dermatoglyphics in schizophrenia. Surveying the literature on palmar dermatoglyphics in schizophrenia, it appears that little work has been done on Indian schizophrenics. Till date only a few studies are available (Biswas & Bardhan, 1966; Singh, 1967; Bali, 1971a & 1971b; Laha, 1978; Kurien et al, 1978; Dasgupta, 1978; Eswaraiah, 1978; Balgir et al, 1980; Karmakar & Malhotra, 1981; Jain, 1991). From the eastern part of India limited amount of study of palmar dermatoglyphics on schizophrenia has been done in the last decade. In this regard, it must be pointed out that the results obtained so far are inconclusive and often contradictory. Therefore, the purpose of the present study is to examine a few dermatoglyphic features in a further series of schizophrenics from West Bengal. Dermatoglyphics (from ancient Greek derma=skin, glyph=carving) is the scientific study of fingerprints. The term was coined by Dr. Harold Cummins[2], the father of American fingerprint analysis, even though the process of fingerprint identification had already been used for several hundred years. All primates have ridged skin and it can also be found on paws of certain mammals and on the tail of certain monkey species. In human and animals dermatoglyphics are present on finger, palms, toes and soles giving insight into a critical period of embryogenesis between 4th week and 5th month when the architecture of the major organ system is developing.Until recently dermatoglyphics has been playing an important role in the field of human population genetics. Now as a result of new discoveries, its potential role is becoming apparent. Already a study of ridged skin, in spite of his inherent difficulties has progressed to a stage where its usefulness is recognized in various branches of human genetics.Although many important discoveries regarding the psychological significance of fingerprint pattern have been made, the main thrust of scientific dermatoglyphic research in the latter half of the twentieth century has been directed into genetic research and the diagnosis of chromosomal defects. Significant investigations have also been carried out into the dermatoglyphic indicators of congenital heart disease, Leukemia, Cancer, Coeliac disease, Intestinal disorder, Rubella embryopathy, Alzheimer's disease, Schizophrenia as well as other forms of mental illness.The current state of medical dermatoglyphics is such that the diagnosis of some illness can now be done with significant degree of accuracy. Researchers claim to be able to diagnose Schizophrenia and Leukemia with up to 90% of accuracy from the patterns of the hand alone.

MATERIALS AND METHODS:

The sample of the present case control study was drawn from Psychiatry OPD and indoor of the Dept. of Psychiatry, R.G. Kar Medical College, and Kolkata. Detailed analysis of finger and palmer print and data interpretation was done in Dept. of Anatomy R. G. Kar Medical College and Dept. of Anthropological Biology, Indian Statistical Institute. Total 58 individuals diagnosed to have Schizophrenia have been taken. Among 58 patients 30 were male and 28 were female. 50 sex matched control group consisting of 25 males and 25 females were also selected from the medical students of the same college.

Study Area:

1. R. G. Kar Medical College, Kolkata, West Bengal
   - Dept of Anatomy
   - Dept of Psychiatry
2. Other Medical Colleges, WestBengal
3. Indian Statistical Institute, 203, B. T. Road, Kolkata

Study Population: Diagnosed Schizophrenia patients (By DSM-TR-IV criteria) and its matched control group.

Inclusion Criteria: Diagnosed Schizophrenia patients (DSM-4-TR Criteria) and its sex matched control group.

Exclusion Criteria: Schizophrenic patients with any other psychiatric co morbidity were not included in the study.Patients with family history of other psychiatric illness were also not included as other psychiatric illnesses have other genetic basis.Patients having any pathology of hands affecting the dermatoglyphic features were not taken to ensure good quality prints.Patients having injury in hand with the result that a digit is missing or deformed and it was impossible to manipulate it for taking prints, such cases had to be rejected

Sample Size: Total 108 individuals that include 58 Schizophrenia patients and 50sex matched control group.

Sample Design: Total 58 Schizophrenia patients (30 males and 28 females) and 50 sex matched control group (25 males and 25 females).

Parameters to be studied :i). Ridge counts and Total finger ridge counts
ii). Absolute total finger ridge count
iii). a-b ridge count

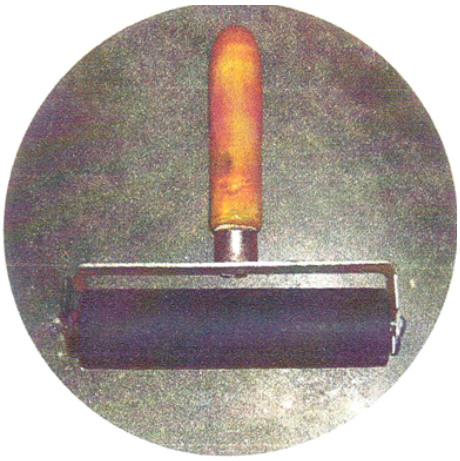
Materials used for dermatoglyphic print: The materials necessary for making ink prints in dermatoglyphics study are simple and not very expensive. They are as follows:

Black duplicating ink,Soap and water, A-1 sized glazed paper, Roller, An inking slab made of glass, Table, Pad, Spirit cotton, Glycerol, PVC oil.

Materials used for taking Palmar Print

Duplicating ink

Roller



The study has been done at R. G. Kar Medical College, Kolkata, and West Bengal, India. Total 108 samples were selected of whom 58 (30 males and 28 females were Schizophrenic) and 50 (25 males and 25 females) matched normal control groups.The data on dermatoglyphics characteristics were collected through finger and palm print by traditional ink method[3] and Schizophrenia patients were diagnosed as per DSM-IV-TR Criteria.The analysis has been done according to Holt[4] and specific statistical analysis was carried out which includes chi-square test, t-test, one way ANOVA and discriminate analysis etc.

Methods of taking dermatoglyphic prints: At first the inking slab was washed with spirit cotton and also the roller. Then a small daub of ink was placed on the inking slab. By the help of the roller a thin, even film of the black printers ink is made. Meanwhile, the subject (either control or Schizophrenic patient) is asked to wash the hand with soap and water. A1 sized glazed art paper of size (15 inch x11 inch) is taken and the space for printing fingers are selected at the bottom below a horizontal line and the palm print is taken above that marked line . In both the cases the sides are marked by a vertical line. The paper is placed at the edge of the table at one side.

The subject should be passive and relaxed and provide the operator freedom in manipulation.

Finger Printing-Finger prints may be plain or dab and rolled type. The plain fingerprint is clearer but the patterns are incompletely registered, so an erroneous classification may be established. To prevent this error here rolled finger print has been taken. After washing with soap and water the ulnar side of the finger is placed on the ink slab and rolled against the thin film of ink up to the radial side. Then the finger is taken off from the finger slab and placed on the paper and rolled as described above .This type of rolled fingerprint is taken in all ten digits and then the subject is asked to wash the hand with soap and water.

Palm printing-After washing with soap and water the inked roller is passed over the palm repeatedly so that all area specially the hollow of the palm and sides are inked properly. A pressure pad is placed under the paper .Then the ulnar side of the palm is placed on the A1 sized glazed paper and the hand is rolled and pressed finally against the pressure pad to print the hollow of the palm. Then the palm is taken off and then the subject is asked to wash the hand with soap and water.

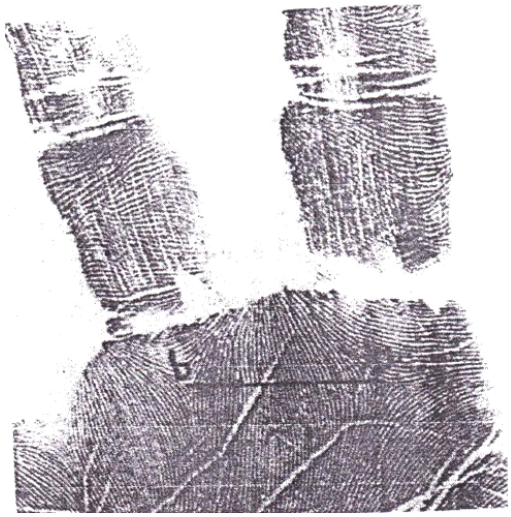
Methods of measuring different parameters used in our study:
Ridge Counting: The number of ridges from the core point to the triradius which touch or cross the line is called ridge count of the pattern. A fine straight line is drawn from point of core to the triradius are excluded during counting.

Digital ridge counting
i).Total finger ridge count: From the point of core to the point of triradius a fine straight line has drawn. In case of loop there is only one triradius so there will be one line but in case of whorl there are two or may be three lines. The ridges are counted. In case of whorls the highest numbers of ridges are taken for that respective finger. The sum of ridges (whorls and loops) of all ten fingers is known as Total Finger Ridge Count (TFRC).

ii).Absolute Finger Ridge Count (AFRC): To measure AFRC the values of ridge counts of both the radial and ulnar side is taken in case of whorls and the ridge counts of loops are summed up.

iii). a-b ridge count: Triradius below the second finger is marked. If more than one triradius is present the nearest point to the radial border is taken in account as

(a). Triradius below the third finger is marked as (b). They are joined by a fine straight line and the ridges are counted.



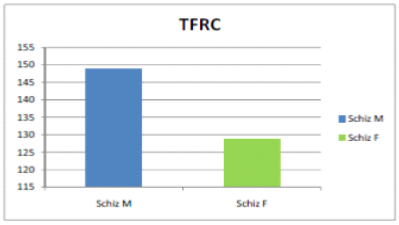
Results and Analysis

Table 1: ***Distribution of mean total finger ridge count for all fingers in Schizophrenics with respect to sex.***

Population	No of individual	Mean TFRC	SD	±SE	t value	Remark
Schizophrenia Male	30	148.93	21.19	3.87	t=3.37	Significant
Schizophrenia Female	28	128.78	23.92	4.6		

From Table-1 it is noted that the mean TFRC of 30 male schizophrenic was 148.93 ± 3.87 with SD of 21.19 and that of female 128.78 ± 4.6

with SD of 23.92. The difference was statistically significant (t=3.37 with DF 55).

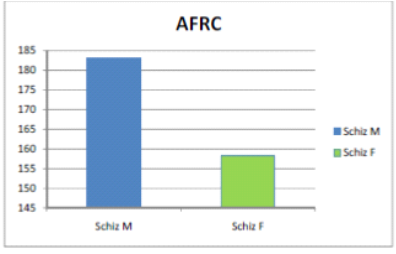


Bar diagram showing distribution of TFRC In schizophrenic male and female.

Table 2: ***Mean absolute finger ridge count in Schizophrenics for all fingers with respect to sex-***

Population	No of individual	Mean AFRC	SD	±SE	t value	Remark
Schizophrenia Male	30	183.10	66.84	12.2	t=1.31	Not significant
Schizophrenia Female	28	158.26	76.04	14.63		

From Table-2 it is evident that incidence of AFRC in male schizophrenics is 183.10±12.2 with SD 66.84 whereas in female schizophrenics it is 158.26±14.63 with SD 76.04.The difference is not statistically significant as the t value is 1.31with DF 55.



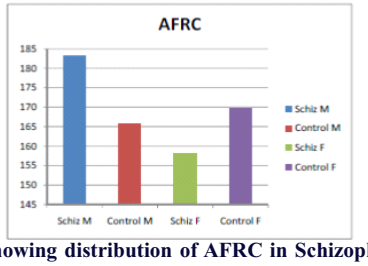
Bar diagram showing distribution of AFRC among schizophrenic males and females.

Table 3: Distribution of Absolute finger ridge count in schizophrenics and control with respect to sex-

Population	No of individual	Mean AFRC	SD	±SE	t value	Remark
Schizophrenia male	30	183.10	66.84	12.2	t=0.98	Not significant
Control male	25	165.76	63.26	12.65		
Schizophrenia female	28	158.26	76.04	14.63	t=0.53	Not significant
Control female	25	169.68	76.41	15.28		

From Table-3 it is evident that incidence of AFRC in male schizophrenics is 183.10±12.2 with SD 66.84 whereas in control male it is 165.76±12.65 with SD 63.26(t=0.98 with DF 53). In female schizophrenics it is 158.26±14.63 with SD

76.04and in control female it is 169.68±15.28 with SD 76.41(t=0.53 with DF 50).The difference is not statistically significant.

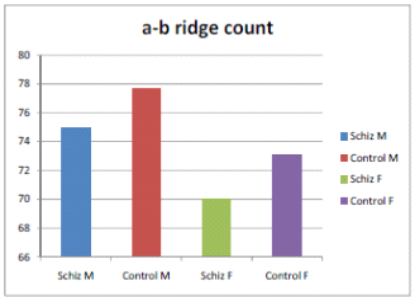


Bar chart showing distribution of AFRC in Schizophrenics and control in relation to sex.

Table 4: Distribution of a-b ridge count in schizophrenics and control individual in relation to sex

Population	No of individual	Mean a-b ridge count	SD	±SE	t value	Remark
Schizophrenia male	30	74.92	8.66	1.58	t=1.24	Not significant
Control male	25	77.68	7.8	1.56		
Schizophrenia female	28	69.99	8.46	1.66	t=1.58	Not significant
Control female	25	73.08	6.66	1.33		

From Table-4 it is evident that a-b ridge count of schizophrenic male is 74.9±1.58 with SD 8.66 and of control males it is 77.68±1.56 with SD 7.8 (t=1.24 with DF 53). In female patients it is 69.99±1.66 with SD 8.46 and in control female it is 73.08±1.33 with SD 1.33(t=1.58 with DF 49). So the difference is not statistically significant.



Bar chart showing distribution of a–b ridge count in schizophrenics and control in relation to sex.

DISCUSSION-

Ridge count:

In our present study we found significant increase mean total finger ridge count (TFRC) in male schizophrenic than female patients. This result is supported by the study report of Rothhammer et al (1971)[5]. Results of our study are further supported by a recent study of Ozyurt et al (2010)[6] as they found significant bisexual difference in schizophrenics ($p<0.003$).Bagga (1986)[7] also reported that sexual differences with regard to TFRC appear to be clear cut for males having higher values than the females.On the other hand in contrast to our study report Mellor (1968) found that male patients as compared to female patients had a TFRC significantly lower than control population. Zavala and Nunzez (1971)[8] found somewhat lower TFRC.Regarding the AFRC we found sexual differences but they are not statistically significant and slight increase in schizophrenics than in controls but results are not statistically significant as well. This result is confirmed by Karmakar and Malhotra (1980)[9] as they found significant differences in AFRC between two sexes.Similar results are also reported from a recent study by Chang et al (2008)[10].

a-b ridge count:

In our study we found significant (t=2.26) bi sexual differences with regard to a-b ridge count. Male schizophrenics have higher mean a-b ridge count than female schizophrenics. However, schizophrenics show a comparatively lower a-b ridge count than control but the difference is not statistically significant. The results are in complete agreement with Sengupta and DasBhuyan (1995)[11].In our present case-control study we had considered 58 schizophrenia patients (as diagnosed by DSM-IV-TR criteria). Out of them 30 were males 25 were females. We had also considered sex matched control groups. Both the digital and palmar prints were taken to make observations of different parameters. Schizophrenic patients have been compared with the control group in relation to sex. Moreover, we observed whether there was any variation of dermatoglyphics in relation to sex among Schizophrenic patients.In our present study the most conspicuous features found is as follows-In our observation the mean total finger ridge count show statistically significant increase in male schizophrenics than female patients. But when patients are compared with control in relation to sex, the study failed to demonstrate any statistically significant differences.Regarding the Absolute finger ridge count, we found sexual differences but they are also not statistically significant. It was also noted that the male schizophrenics show significantly higher mean a-b ridge count than female schizophrenics. From the present study it is evident that there are some

statistically significant changes in schizophrenia patients which may be useful in population genetics. For diagnosis of schizophrenia with the help of palmar dermatoglyphics we need further studies in future

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