STUDY OF PALMAR DERMATOGLYPHICS IN SCHIZOPHRENIA
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ABSTRACT

**Background:** Dermatoglyphics is the scientific study of epidermal ridges and their configuration on the palmar region of hand and fingers. Development of dermatoglyphic characteristics are under genetic control. This is apparent from the clear similarity in dermatoglyphics among related individuals. There are many diseases known to be caused by abnormal genes. Dermatoglyphic study carried out in Schizophrenia have been evaluated and critically examined.

**Materials and methods:** The present study included 100 patients of Schizophrenia attending out-patient and in-patient department of Psychiatry at SRMS- IMS Hospital, Bareilly. Similarly equal numbers of paramedical students were included as controls. Individuals with history/ family history of any illnesses were excluded from controls. Dermatoglyphic prints were taken by the modified Purvis method and subjected for detailed dermatoglyphic analysis.

**Results:** Significant dermatoglyphic findings were observed in Schizophrenics compared to control viz. loops are the predominant patterns and arches are the least found pattern, significant loops in right hand and arches in left hand in females, increased frequency of loop patterns in third and fourth interdigital area (I3, I4) in Schizophrenics as compared to controls. There is increase inatdangle and lower a-b ridge count, decreased total finger ridge count(TFRC) and absolute finger ridge count(AFRC) and abnormal palmar creases.

**Conclusion:** Significant findings of dermatoglyphic features were observed in Schizophrenics compared to control group. Dermatoglyphics provide a simple and economical means of assessing the diseases with strong hereditary basis and can be deployed as a screening method for Schizophrenia.

**KEYWORDS:** Schizophrenia, Dermatoglyphics, Arches, Loops, Whorls.

INTRODUCTION

Dermatoglyphics is the scientific study of epidermal ridges and their configurations on the palmar aspect of hand and fingers. The term dermatoglyphics was coined by Cummins and Midlo in 1926 and was derived from Greek words ‘derma’ means skin and ‘glyphics’ means carvings. The ridge pattern depends on the cornified layer of epidermis and dermal papillae. The typical patterns of epidermal ridges are...
determined since their formation in foetus [1]. The ridges are differentiated during third and fourth month of foetal life and once formed they remain permanent throughout life except in the dimension in proportion to the growth of a person. The original ridge characteristics are not disturbed unless the skin is damaged to a depth of about one millimeter [2].

Development of dermatoglyphic pattern is under genetic control. This is evident from the clear resemblance of dermatoglyphs among related persons. There are many disorders known to be caused by abnormality in genes. When there is any deformity in the genetic makeup of parents it is inherited to the children and is evident in dermatoglyphic pattern [2]. Dermatoglyphics as diagnostic aid is well established in a number of disorders which have a strong hereditary basis, and is employed as a method of screening various diseases.

Although it is used in predicting the diagnosis of genetic diseases, dermatoglyphics is also used in forensic science for individual identification. It is of remarkable use in the field of Physical Anthropology, Human Genetics and Medicine. The research put forth by some scientists suggest that muzzle prints of animals similar to fingerprints in human beings could be used as permanent method of identification to check fraud particularly in insurance issues [3]. Schizophrenia is a clinical entity of variable disruptive psychopathology that involves cognition, emotion, perception, and other aspects of behavior. The display of these manifestations varies individual to individual, but the effect of the illness is severe and usually long lasting. The disorder begins before the age of 25, remains throughout life and it affects individuals of all social strata. Both patients and their family suffer from poor care and social rejection because of widespread ignorance about the disorder. Although often described as a single disease, it comprises of a group of disorders with heterogenous etiologies, and includes patients whose clinical presentations, treatment response, and courses of illness vary [4].

Taking into account the genetic influence of dermatoglyphics and Schizophrenia, the study is done to find out correlation between them, so that dermatoglyphics can be helpful in the diagnosis of predisposition towards these diseases at an earlier age.

**MATERIALS AND METHODS**

The present study included 100 patients of Schizophrenia attending out-patient and in-patient department of Psychiatry at SRMS- IMS Hospital, Bareilly, similarly equal numbers of paramedical students were included as controls. Individuals with history/ family history of any illnesses were excluded from controls. Study was carried out with prior permission of institutional ethical committee. Inform consent of all subjects (patients and controls) was taken. Dermatoglyphic prints were taken by the modified Purvis Smith [5] method and subjected for detailed dermatoglyphic analysis. This method was selected from the various methods described in literature because of following advantages:

1. Simple technique.
2. Low cost.
3. Clarity of Prints.
4. Less time consuming.

Materials used for the study include Kores Quick drying duplicating ink, rubber roller, gloves, spirit, A4 size White Bond paper, card board roller, cotton roll, scale, pencil and Pen, protractor – To measure ‘atd’ angle, needle with a sharp point for ridge counting and magnifying lens.

The palm and fingers were printed by the rolling palm technique. A line was drawn from triradii ‘a’ to triradii ‘b’. Ridge counting was done with the help of a sharp needle and recorded on the same paper with the pencil. The count excludes the ridges forming the triradii. When an accessory triradius ‘a’ is present, counting is still done from the ‘a’ triradius which is invariably the more radial of the two. Another line was drawn from axial triradius ‘t’ to the digital triradius ‘d’ and ‘a’ and all the three angles in the triangle were measured using a protractor and recorded.

**Parameters observed on palm:** For qualitative analysis, the different subtypes of ridge patterns (whorls, loops and arches) were grouped together and were classified and patterns of palmar creases were studied.

Quantitative analysis of finger prints included total finger ridge count (TFRC) and absolute
finger ridge count (AFRC), a-b ridge count and atd angle.

TFRC represents the sum of ridge counts of all ten digits, where only the larger count is used on those digits with more than one ridge count. It expresses the size of pattern. AFRC is the sum of the ridge counts from all the separate triradii on the fingers. It reflects the pattern size as well as pattern intensity, which depends on the pattern type.

Statistical calculations were done by SPSS v17.0. P value is the probability rate at 0.05 level of significance for the corresponding degree of freedom.

P< 0.05 is significant.

RESULTS AND DISCUSSION

The dermatoglyphic patterns on right & left hand of schizophrenics and controls are compared to evaluate significant pattern of identifiable difference between them. 100 schizophrenic subjects (50 males and 50 females) and 100 control subjects (50 males and 50 females) were taken into consideration for the study.

Qualitative analysis of finger tip patterns

Table 1: Fingertip Pattern in right and left hand of Schizophrenic patients.

<table>
<thead>
<tr>
<th></th>
<th>Right Hand</th>
<th>Left Hand</th>
<th>Total</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arches</td>
<td>47 (9.1%)</td>
<td>54 (10.9%)</td>
<td>100</td>
<td>0.593</td>
</tr>
<tr>
<td>Loops</td>
<td>325 (65.1%)</td>
<td>289 (57.7%)</td>
<td>614</td>
<td>0.153</td>
</tr>
<tr>
<td>Whorls</td>
<td>128 (25.7%)</td>
<td>158 (31.4%)</td>
<td>286</td>
<td>0.234</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td>500</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 shows frequency distribution and statistical comparison of Fingertip patterns in right and left hand of Schizophrenic patients. Loops (61.4%) are the predominant pattern found in schizophrenics cases but with non significant association and arches (10%) are the least common pattern present, also with no statistically significant difference.
In females, arches (15%) and loops (67%) showed statistically significant association (p<0.05) with arches predominating in left hand (26%) as compared to right hand (4%). Loops showed increased frequency in right hand (78%) as compared to left hand (56%). In males, loops (59.2%) are the predominant pattern but with non significant association (p>0.05).

The maximum distribution of whorls and loop were present in the 4th digit with significant association in schizophrenics.

There is an increased frequency of loop patterns in third and fourth interdigital area (I3, I4) in schizophrenics as compared to controls. This pattern was obvious in both the sexes n in both hands concomitantly. There was also presence of higher frequency of abnormal palmar creases. There was non significant evidence of presence of simian crease in both males n females irrespective of any hand.

**Quantitative Analysis**

Table 4 shows statistical calculation of a-b ridge count in Schizophrenia and controls. The mean value of a-b ridge count in Schizophrenic females is lower in right hand as compared to the controls but statistically non-significant. Left hand shows no significant difference between controls and Schizophrenics.

**Table 5** shows statistical calculation of atd angle in Schizophrenics and controls. There is significant increase in the mean value of atd angle in Schizophrenics (mean=55.60) in right hand of males as compared to the controls (mean=44.43). There is significant increase in the mean value of atd angle in Schizophrenics (mean=46.16) in left hand of males as compared to controls(mean=41.30).

Table 6 shows the mean Total Finger Ridge Count (TFRC) in female Schizophrenics was lesser (129.9) with S.D. of 2.75 as compared to Controls which had mean value(158.8) with S.D. of 2.9 with no statistical significance. The mean Absolute Finger Ridge Count (AFRC)