

**Research Article**

**Quantitative dermatoglyphic analysis in patients of oral sub mucous fibrosis**

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**Abstract**

**Background-** Dermatoglyphics is the collective name for all those integumentary features within the limits to be defined and it applies to the division of anatomy which includes their study. Diagnosis of many diseases which are genetically or non genetically determined like Diabetes mellitus, Schizophrenia, Hypertension, etc can now be aided by dermatoglyphic analysis. Oral submucous fibrosis is a chronic precancerous oral disease, specially seen in guthka chewers, but not all the guthka chewers develops the disease or non guthka chewers may also develop the disease. Genetic predisposition explains such individual variability. Such genetic predisposition can be explored with the help of dermatoglyphic studies.

**Objective-** The study was aimed at finding the dermatoglyphic markers for the patients of Oral submucous Fibrosis by assessing the quantitative dermatoglyphic parameters.

**Method-** 100 guthka chewers without Oral Submucous fibrosis and 100 Guthka chewers with Oral submucous fibrosis were selected for the study and their quantitative dermatoglyphic analysis with specific reference to total finger ridge count (TFRC) and 'atd' angle was carried out and was statistically analyzed.

**Result-** There was significant decrease in mean TFRC and 'atd' angle for the patients of Oral sub Mucous Fibrosis.

**Keywords:** Dermatoglyphics, Oral submucous fibrosis, Guthka Chewers, TFRC, 'atd' angle

**1. Introduction**

Dermatoglyphics (Derma = Skin + Glyphe = Carve) is a collective name for all those integumentary features within the limits to be defined, and it applies also to the division of Anatomy which includes their study.<sup>1</sup>

Study of the patterns of the epidermal ridges of fingers, palm and sole can serve as an aid to the diagnosis of many diseases, particularly those caused by chromosomal aberration, which are frequently accompanied by distortion of patterns, and non-genetically determined diseases as well.<sup>2</sup>

Diagnosis of Diabetes Mellitus<sup>3,4</sup> Schizophrenia<sup>5</sup>, hypertension<sup>6</sup>, etc. can now be aided by dermatoglyphic analysis. Since most of the investigations needed to confirm the diagnosis in hereditary disorders are complex and expensive, dermatoglyphics can be efficiently employed with other clinical signs as a screening procedure to define indications for these laboratory procedures.

Oral submucous fibrosis is a chronic precancerous disease of oral mucosa characterized by inflammation and progressive accumulation of collagen fibers in lamina propria and deeper connective tissue followed by stiffening of an otherwise yielding mucosa resulting difficulty in opening the mouth.<sup>7,8</sup>

The available epidemiological evidences suggest that chewing of Gutkha (Areca Nut) is an important risk factor for Oral Submucous Fibrosis, but not all the chewers develop the Oral Submucous Fibrosis. Genetic predisposition explains such individual variability.<sup>9</sup>

If dermatoglyphic marker of Oral Submucous Fibrosis is found, it will be of immense clinical importance in this era of Gutkha chewing, so that the people developing Oral Submucous Fibrosis may be forecasted amongst the Gutkha chewers.

## 2. Material and Method

A prospective study was carried out at Department of Anatomy, Jawaharlal Nehru Medical College, Sawangi (M), Wardha and designed to collect the dermatoglyphic prints of the gutkha chewers with and without Oral Submucous Fibrosis. Appropriate approval of Ethical Committee, Jawaharlal Nehru Medical College, Sawangi (M), Wardha was obtained. Study consisted of 200 subjects which were divided into two groups.

Group A- 100 subjects with the habit of gutkha chewing were selected from

1. Persons accompanying the patients,
2. Staff and students of various institutes in the campus.

Group-B- were the diagnosed patients of Oral submucous fibrosis with history of gutkha chewing habit attending the out patient department of Oral Medicine and Diagnosis, Sharad Pawar Dental College, Sawangi (M), Wardha.

### 2.1 Method

Dermatoglyphic prints were obtained using ink method described by Cummins and Midlo (1961)<sup>1</sup> and as per guidelines by American Association of Dermatoglyphics (Reed T. Meier R. 1990).<sup>10</sup>

Statistical Analysis

The data was analyzed statistically by using the Student t Test.

## 3. Observations and Result

The quantitative analysis of the dermatoglyphic prints were made under following headings.

### 1) Quantitative analysis of finger prints- Total Finger Ridge Count (TFRC)

TFRC represents the sum of ridge counts (Number of ridges crossing the line drawn from core of the pattern to the triradius, Fig. No. 1) of all ten digits, where only the larger count is used on those digits with more than one ridge count. It expresses size of pattern.

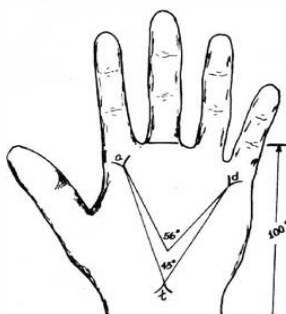
**Figure No. 1. Showing the method to count ridge count (for single digit)**



**2) Quantitative analysis of palmar area- ‘atd’ angle.**

It is the most widely used method in interpreting the position of axial triradius (t). It is formed by lines drawn from digital triradius ‘a’ to the axial triradius ‘t’ and from axial triradius ‘t’ to the digital triradius ‘d’. In case of more than one axial triradii the widest ‘atd’ angle is counted. The more distal the position of t, larger is the ‘atd’ angle.

**Figure No.2 showing ‘atd’ angle**



**Table No. 1 Total Finger Ridge Counts In Group-A And Group-B**

GROUP	NUMBER	MEAN	S.D.	p value
GROUP-A	100	143.52	30.391	0.03 Significant
GROUP-B	100	131.4	46.11	

Mean TFRC is significantly low in Group B patients when compared with Group A as shown in Table No. 1 p = 0.03.

**Table No.2 ‘atd’ Angles In Group- A And Group-B**

GROUP	NUMBER	RIGHT HAND		LEFT HAND	
		MEAN	S.D.	MEAN	S.D.
GROUP-A	100	44.66 °	8.34 °	44.48 °	9.07 °
GROUP-B	100	40.72 °	5.47 °	40.57 °	5.86 °
p-value		<0.0001*		<0.0001*	

Table No. 2 shows mean atd angle in right and left hand of group A and group B. there was significant decrease in mean atd angle of both hands in group B when compared with group A

Right hand p < 0.0001, highly significant

Left hand p < 0.0001, highly significant

**3. Discussion**

The hypothesis that antenatal factors are involved in the pathogenesis of a disorder which becomes apparent later in life would be suggested if a relationship between a prenatal event such as dermal ridge formation and the disorder could be established. Thus the dermal ridges have various notable characteristics which make them important not only in personal identification of a person but also in human biology for various reasons such as

1. Unlike many bodily traits dermal ridges and configurations once formed remain unchanged except in dimension
2. The ridges are environmental stable and begin to appear from 5<sup>th</sup> month of intrauterine life.
3. Although the patterns formed by the ridges vary in size and shape, still they can be classified into definite main types.

Dermal ridge patterns are genetically determined and have been used as screening procedures in many clinical conditions.

Oral sub mucous fibrosis is a pre malignant condition affecting oral cavity. Chewing of areca nut is said to be the most important risk factor for development of the disease.

Millions of the people around world chew gutkha but not all of them develop oral submucous fibrosis. Genetic predisposition explains such individual variability<sup>11</sup>. The disease was also reported in some cases who do not practice betel nut chewing<sup>12</sup>. Familial occurrence of the disease was also reported in Northern Kerala India<sup>13</sup>.

In present study we studied quantitative dermatoglyphic features like Total Finger Ridge Count (TFRC) and 'atd' angle. Total finger ridge count was significantly decreased in patients of oral submucous fibrosis. None of the earlier worker reported this finding. The 'atd' angles of right and left hand were significantly decreased in patients of oral submucous fibrosis as compared to normal gutkha chewers. Same finding is reported by Veena HS *et al* (2004)<sup>11</sup>.

In the present era of developing nation like India many young adults are involved in the habit of Gutkha chewing which happens to be the most important predisposing factor for developing Oral Malignancies. Dermatoglyphic markers like TFRC and atd angle can be used as a large group screening tools to identify the persons who will be developing OSMF so that they can be counselled accordingly.

#### 4. Conclusion

Such type of studies are needed to be undertaken under large scale to universalize the dermatoglyphic markers of oral submucous fibrosis which in turn will be acting as a powerful screening tool for the gutkha chewing population.

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