Comparison of Finger Print Patterns in Patients with and without Oral Submucous Fibrosis - A Dermatoglyphic Study

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Introduction:

Fingerprint analysis for personal identification is well-known, as it is unique to all individuals and remains unchanged over a lifetime.[1] Study of fingerprints is known as Dermatoglyphics.[2]

Dermatoglyphics is the "study of dermal ridge patterns on volar surfaces of fingers, palms, and soles." Formation of ridges initiates in 13th week of prenatal life, while the formation of patterns is completed by 19th weeks of development.[2]

Gallon in 1892 classified ridge patterns of distal phalanges into three basic types: whorls, loops, and arches. A) Arch pattern: Types of arch patterns include: i) Simple or plain arch pattern: This comprises of ridges crossing fingertips from one to another side without curving; ii) Tented arch pattern: This pattern is characterized by a point of confluence termed as "triradius" as the ridges radiate from this point to three directions.; B) Loop pattern: In this, ridges enter on one side, undergo abrupt recurve, and leave on the same side. If the ridge opening is on ulnar side, the loop is called "ulnar loop"; if it opens on a radial side, it is called "radial loop." C) whorls: This pattern contains two or more triradii. Henry in 1973 used the "whorl" for ridged encircling core.[2]atd angle is the angle found by the axial triradius which is situated near the base of 5th metacarpal and the digital triradi.[3]Various studies show agreement of dermatoglyphic features in assessing various medical conditions.[3,4,5]Oral submucous fibrosis (OSMF) precancerous condition and is chronic, resistant disease characterized by juxta-epithelial inflammatory reaction and progressive fibrosis of

the submucosal tissues. Onset of this disease is insidious and is often 2–5 years of duration. It is commonly prevalent in Southeast Asia and Indian subcontinent. The prevalence rate of OSMF in India is about 0.2%– 0.5%. This increased prevalence is due to increased use and popularity of commercially prepared areca nut and tobacco product - gutkha, pan masala, flavored supari, etc. The malignant transformation rate of OSMF was found to be 7.6%.[6]

Henceforth, present study was undertaken to find out correlation of dermatoglyphics in OSMF patients and to find out as it could act as a useful tool in assessing the risk of OSMF in patients.

Inclusion criteria

- Subjects chewing tobacco/areca nut for more than 1 year with or without use of tobacco in other forms
- Restricted oral opening with palpable fibrous bands and/or burning sensation of mucosa were included in the study group
- Those having no palpable fibrous bands on clinical examination and/or burning sensation of mucosa (no signs or symptoms of OSMF) were included in the control group.

Exclusion criteria

- Oral lesions due to other causes such as sharp tooth margins, improper restorations, prosthesis, alcohol, or smoking
- Betel nut chewers with any other oral lesions
- Patients with scars or any injury to digits
- Patients with any systemic diseases.

Material and method

This cross-sectional study was carried out in the Department of Oral Medicine and Radiology under institution setting comprised of 30 subjects of age ranges between 30 to 50 years, 15 patients with and 15 patients without oral submucous fibrosis with history of gutkha chewing since 10 years. The finger prints of individuals of similar age group and gender with history of Gutkha chewing with oral submucous fibrosis and withoutoral submucous fibrosis (control group) were taken for the study. Ethical clearance was obtained from institutional ethical committee. Informed consent was taken from the individuals. Patients of OSMF diagnosed and confirmed based on clinical examination and patients history. Patients were asked to fill proforma that included data regarding age, sex, address, history of gutkha chewing and other relevant medical history. Patients were asked to wash their hands with soap water and then the fingerprints were taken using Camel ink on an A4 white paper by using ink and paper method which were studied for the pattern. Finger print pattern configurations were categorized as arches, loops and whorls. In order to find out the frequency of finger print patterns both hands i.e. all ten fingers of an individual were considered together.

Statistical analysis

Statistical analysis was done with the help of SPSS version 21. atd angles were measured in both hands and mean standard deviation calculated. Chi square test was applied with p-value <0.05 considered as significant value.

Result

Table 1 : Comparison of percentage frequency of finger print patterns in patients with history off gutkha chewing with and without OSMF

	Group A (OSMF) n (%)	Group B (Control) n (%)	Chi square test	p value, Significance
Arch	15 (5%)	41 (13.66%)	Chi = 5.12	p = 0.028*
Radial Loop	70 (23.33%)	86 (28.66%)	Chi = 1.36	p =0.193
Ulnar loop	130 (43.33%)	75 (25%)	Chi = 12.08	p = 0.001*
Whorl	85 (28.33%)	98 (32.66%)	Chi = 0.98	p =0.381

*p < 0.05 – significant difference   **p<0.001 – highly significant difference

Graph 1: graphic representation of table 1

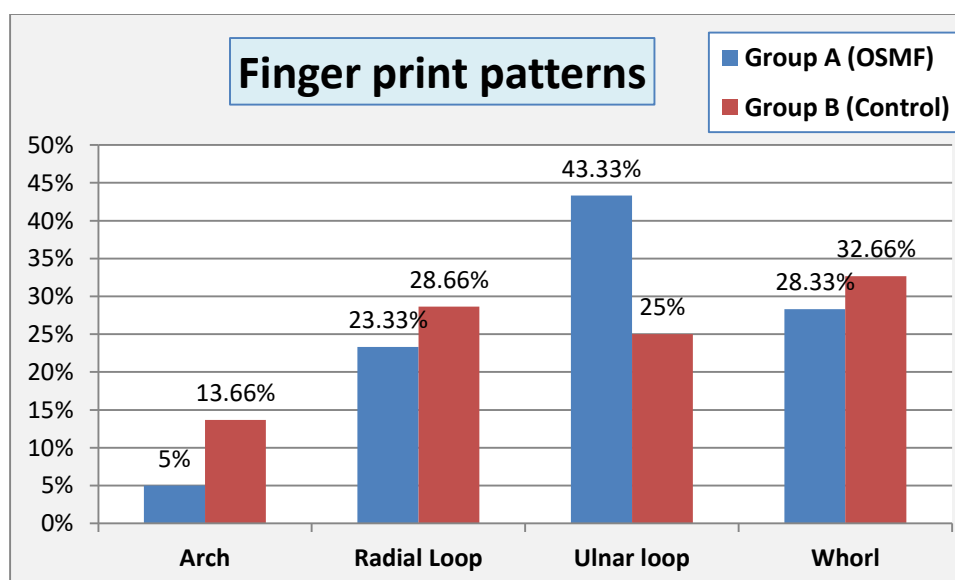**Table 2 : Comparison of mean atd angle in patients with history off gutkha chewing with and without OSMF respectively**

	Group A (OSMF) Mean (SD)	Group B (Control) Mean (SD)	Unpaired t test	p value, Significance
Right hand	45.8 (4.95)	49.76 (5.4)	t = - 8.93	p = 0.026*
Left hand	42.06 (3.73)	47.8 (5.98)	t = -11.24	p =0.008*

*p < 0.05 – significant difference   ****p<0.001 – highly significant difference**

Graph 2: graphic representation of table 2
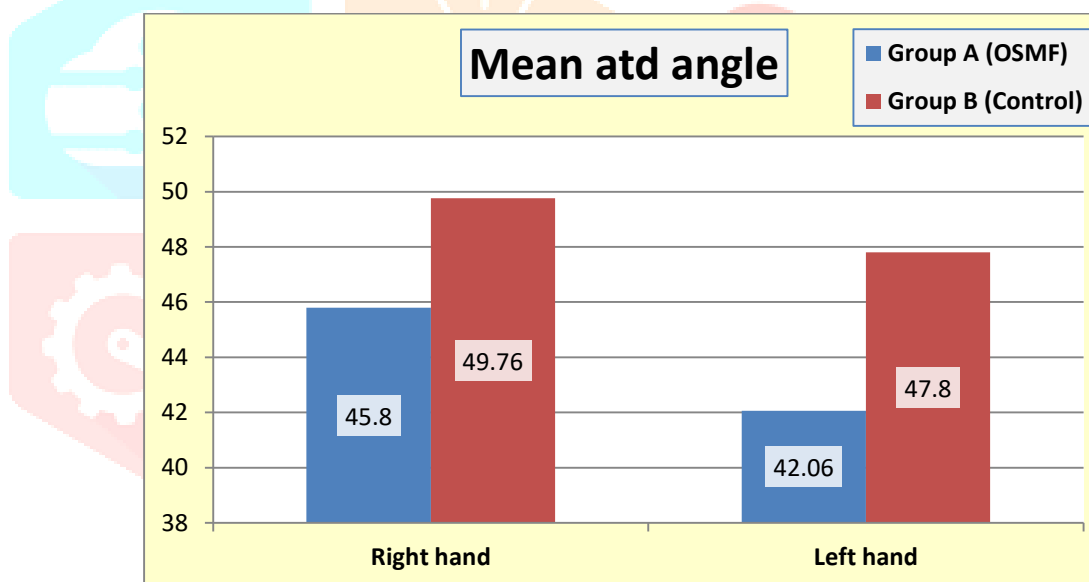
In the present study all patients were male with mean age of 40 ± 2.4 years and with a history of 14.3 with a history of 14.3 ± 1.2 years. The table 1 shows percentage frequency of finger print pattern in patients with OSMF group and in patients without OSMF. Analysis of finger prints showed 5% arch pattern, 23.33 % radial loops, 43.33% ulnar loops pattern and 28.33% whorls pattern in patients with OSMF and 13.66% arch pattern, 28.66% radial loops, 25% ulnar loops pattern and 32.66% whorls pattern in patients without OSMF. Significant p-value was found in arch and ulnar pattern with p value of 0.028 and 0.001 respectively which is less than 0.05. In present study ulnar pattern was highly significant. Table 2 shows mean atd angle in right and left hand and there was significant decrease in mean atd angle of both hands in patients with OSMF in comparison to patients without OSMF.

Discussion

OSMF is a peculiar disease which is chronic, progressive, irreversible and precancerous in nature. It affects oral, oropharyngeal, and at times esophageal mucosa.[7]

The age group of the present study was between 15 and 48 years which was similar to the study conducted by Punit Shetty (2016).[8]Tamgire DW et al[9] conducted a study on patients of Oral submucous Fibrosis by assessing dermatoglyphic parameters and reported that there was a significant decrease atd angle for the patients of Oral sub Mucous Fibrosis. Punith Shetty[8] et al conducted a cross sectional study on Dermatoglyphics as a genetic marker for oral submucous fibrosis and concluded as it shows promising results for determining the genetic susceptibility of individuals to develop OSMF. Gupta A et al[10] studied role of dermatoglyphics as an indicator of precancerous and cancerous lesions of the oral cavity and reported that right hand showed decrease in atd angle and decrease in frequency of palmar accessory triradii in OSMF patients.

In the present study, the whorl cannot be used as a predictor for OSMF in an individual consuming areca nut. Individuals with OSMF had higher number of ulnar loop pattern than control group suggesting that individual with ulnar loop pattern have a greater propensity to develop OSMF if they have the habit. On the other hand, individuals in the control group had higher number of whorl pattern than the OSMF group, suggesting that individuals with higher number of whorlis less likely to develop OSMF in spite of having the habit. Further studies have to be conducted to confirm the same.

Conclusion

To conclude, the fingerprint pattern in an individual is genetically determined and is now beginning to prove itself as a useful tool for investigations in conditions with genetic basis. It will be of immense clinical importance in the gutkha chewing individuals, so that people with a tendency to develop OSMF may be detected earlier among the gutkha chewers and can recognize a person in the prefibrosis stage.

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