Original Article

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Study of Fingertip Patterns in Oral Submucus Fibrosis Associated with Chronic Gutkha Chewing

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Abstract

Introduction: Multiple genes determine fingerprint configuration and the study of fingerprints reveal vital genetic and medical information about an individual. Any deviation in dermatoglyphics pattern indicates a genetic difference between control group and pathological population [2] .Chewing of guthka containing areca nut and tobacco is an important risk factor for oral submucus fibrosis (OSMF) but the non chewers are also developing OSMF.Genetic predisposition explains such occurrence of OSMF with or without habits of chewing guthka containing areca nut. *Aims:* This study was aimed to search for a dermatoglyphic marker that will be helpful to identify predisposition of a person with guthka chewing habits for developing OSMF. *Objectives:* To find any statistically significant variation in fingertip patterns of chronic guthka chewers in pathologic group with development of OSMF and control group without development of OSMF. *Material and Methods:* The control group A: were subjects with history of guthka chewing habit without clinical OSMF. The study group B: Patients with clinically diagnosed OSMF with history of guthka chewing habits were from routine ENT OPD patients at SRTR Govt. medical college and Rolled prints of palm and fingers of right and left hands of all subjects were taken and analyzed following standard methods of Cummins and Midloe. *Result:* When individual digit wise split up of fingertip patterns from both the hands were compared in pathologic and control group statistically significant differences were observed in distribution of fingertip patterns in group A and group B. *Conclusion*: Individual digit wise distribution of fingertip patterns can be used to determine the predisposition of a person with guthka chewing habits to develop OSMF

Keywords: Fingertip Patterns; Oral Submucus Fibrosis; Gutkha Chewing.

Introduction

Palmer dermatoglyphics is the study of the dermal ridges found on the finger tips, palm and sole with its qualitative and quantitative traits which are non adaptive and free from paratypic influences [1].Finger prints are unique to all individuals and remain unchanged over lifetime. Multiple genes determine fingerprint configuration and the study of fingerprints reveal vital genetic and medical information about an individual. Any deviation in dermatoglyphics pattern indicates a genetic difference between control group and pathological population [2].

Oral submucus fibrosis (OSMF/OSF) is a chronic, complex, premalignant lesion of the oral cavity, characterized by juxtaepithelial inflammatory reaction and progressive fibrosis of the submucosal tissue. As the disease progresses, the jaw become rigid to the point that the person is unable to open the mouth [3].

OSMF has many predisposing factors like areca nut and tobacco chewing, malnutrition etc. Other factors such as genetic and immunological predisposition probably play a role as OSMF has been reported in families whose members are not in habit

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of chewing areca nut or betel quid [4].

Association of areca nut chewing in the occurrence of OSMF has been proved by many studies [5, 6] but few researches had shown patients presenting with OSF who do not report having areca nut habit [7]. Also a study showed 4.2% female who chewed areca nut did not use tobacco suffered from OSMF [8].

This shows that chewing of guthka containing areca nut and tobacco is an important risk factor for OSMF but the non chewers are also developing OSMF. Genetic predisposition explains such occurrence of OSMF with or without habits of chewing areca nut. There has been a relative inadequacy of research into this area, wherein dermatoglyphics has been used in the prediction in an individual for the susceptibility towards the development of such lesion.

Aims

This study was aimed to search for a dermatoglyphic marker that will be helpful to identify predisposition of a person for developing OSMF with guthka chewing habits.

Objectives

To find any statistically significant variation in fingertip patterns of chronic guthka chewers in pathologic group with development of OSMF and control group without development of OSMF.

So this study was undertaken to search for a dermatoglyphic marker in individuals with OSMF so that individuals with guthka chewing habits and similar fingertip patterns can be identified at an earlier stage and preventive measures can be taken in these individuals to prevent occurrence of OSMF which is premalignant lesion.

Material and Methods

The patients for the dermatoglyphic study in OSMF were selected from regular OPD patients of department of ENT at SRTR Govt. Medical College Ambajogai. Study consisted of two groups depending on History of gutkha chewing habit and presence or absence of clinically diagnosed OSMF. Then the subjects were divided into two groups

Group A: 100 Subjects with H / O Gutkha chewing for >2 yrs. Duration without clinical OSMF

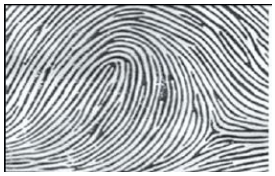
Group B: 100 Subjects with H / O Gutkha chewing >2 yrs duration with clinical OSMF

After explaining about the study to the subjects an informed consent was obtained.

Materials used for taking finger prints were

1. Printer's ink (kores)
2. Glass slab
3. Roller sponge
4. Good quality papers.

Subjects were first asked to wash their hands with soap and water and dried with towel then printer's ink was uniformly spread over right and left hands.



Loop

Whorl

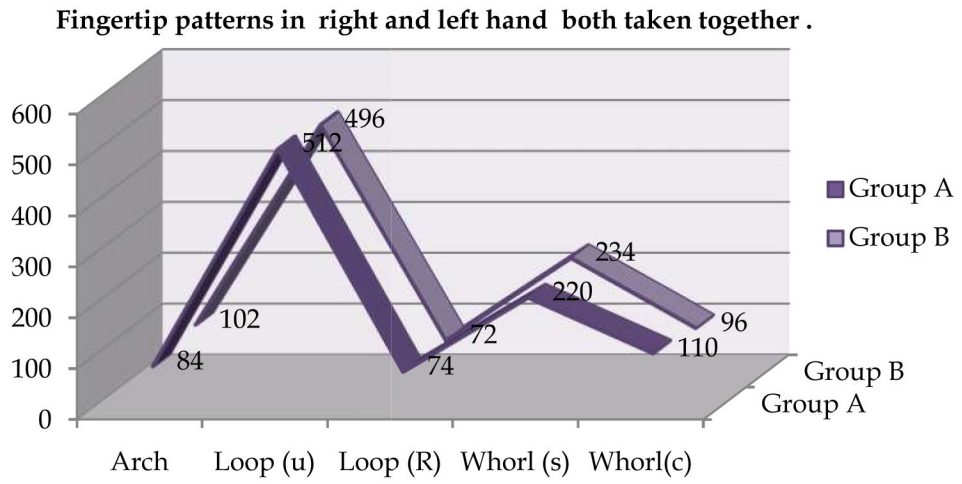
Arch

Rolled prints of palm and fingers of right and left hands of all subjects were taken and analyzed after following standard methods of Cummins and Midloe [9].

Table 1: Fingertip patterns in both right and left hand taken together

Pattern	Group A(n=100) Total (count 1000)	%	Group B(n=100) Total (count 1000)	%	X^2	P value
Arch	84	8.4%	102	10.2%	3.4	
Loop (ulnar)	512	51.2%	496	49.6%	Df: 4	0.49
Loop(Radial)	74	7.4%	72	7.2%		
Whorl (simple)	220	22%	234	23.4%		
Whorl(composite)	110	11%	96	9.6%		

X^2= Chi square test *p<0.05 significant



Graph 1: Showing Equal distribution in group A and Group B of fingertip patterns taken together

Table 2: Individual digit wise split up of finger tip patterns from both the hands in group A and group B.

Finger	Right/Left	Group A/B	Arch	Loop (ulnar)	Loop (radial)	Whorl (simple)	Whorl (composite)	Significance
	right	A	0	58	0	18	27	X2: 11.01;df:2
D1		B	0	54	0	42	18	P:0.00405 S*
	left	A	11	54	7	20	17	X2: 1.12;df:4
		B	12	54	12	24	12	P:0.88 NS
	right	A	16	49	7	17	20	X2: 1.66;df:4
D2		B	18	50	12	22	18	P:0.79 NS
	left	A	21	59	30	31	0	X2: 15.3;df:3
		B	24	56	6	36	0	P:0.0015 S*
	right	A	3	63	0	10	22	P>0.05 (fisher exact
D3		B	6	60	0	12	18	test)
	left	A	5	55	3	12	12	X2: 3.24;df:4
		B	6	54	6	14	6	P:0.51NS
	right	A	9	27	0	30	6	X2: 1.69;df:3
D4		B	12	24	0	42	6	P:0.63 NS
	left	A	6	24	7	12	6	X2: 12.9;df:4
		B	6	24	12	0	6	P:0.01 S*
	right	A	9	52	11	20	0	X2: 7.06 df:4
D5		B	12	54	21	24	6	P:0.13 NS
	left	A	5	71	9	50	0	X2: 20.69 df:4
		B	6	66	15	18	6	P:0.0003 S*

D1: Thumb D2: Index finger D3: Middle finger D4: Ring finger D5: Little finger
X^2= Chi square test *p<0.05 significant

Observation and Results

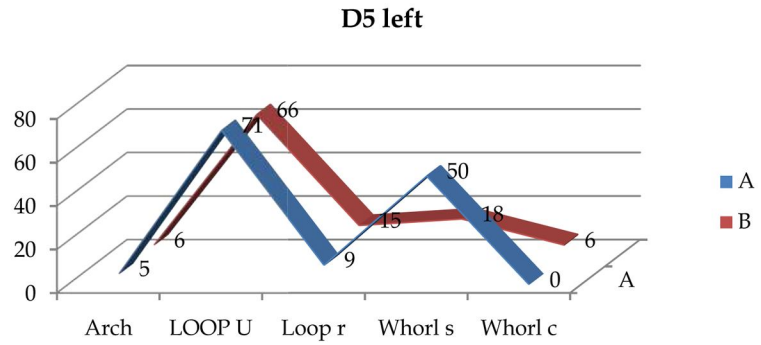
From Table 1 and Graph 1 it was found that ulnar loop is the most commonly observed fingertip pattern in both group A (51.2%) and group B (49.6%).

All the fingertip patterns were equally distributed in both the groups and were statistically insignificant for the fingertip pattern distribution in right and left hand taken together.

So we went for individual digit wise fingertip pattern distribution from right and left hands from group A and group B.

When individual digit wise distribution of fingertip patterns from both the hands was taken and compared following findings were observed after applying Chi-square test and Fisher's Exact test wherever necessary.

Above Table 2 shows the fingertip pattern distribution in individual digit of right and left hands in group A and group B. We found that there was statistically significant differences in fingertip pattern

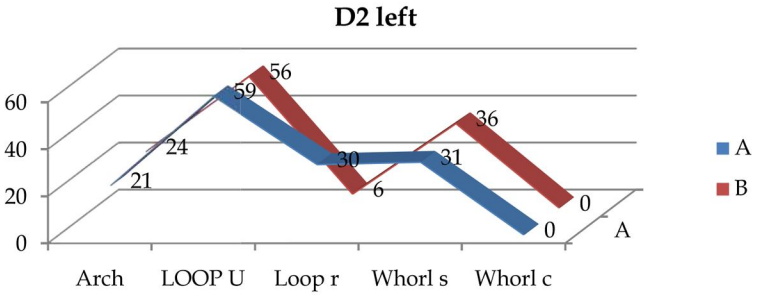


Graph 2: Showing significant decrease in simple whorl and increase in composite whorl in left little finger in Group B

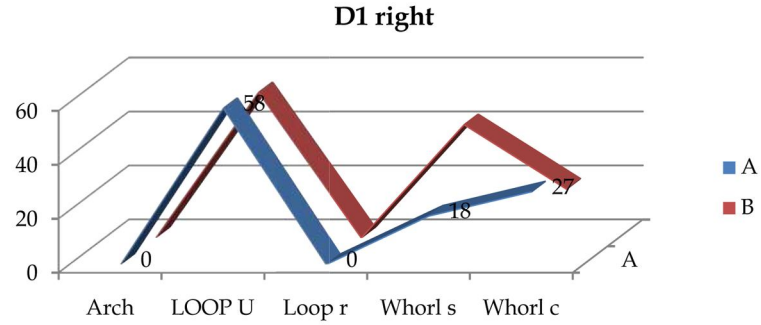
distribution in control group A and pathological group B.

We arranged these findings in order of its significance which can be used as a dermatoglyphic marker in chronic guthka chewers to predict the occurrence of OSMF.

1. Highly significant reduction in simple whorl and increased composite whorl in left little fingertip along with increased composite whorl in right little finger in group B as compared to group A.



Graph 4: Showing significant decrease in simple whorl pattern in left ring finger in group B



Graph 5: Significant increase in simple whorl pattern in right thumb Group B.

2. Significant decrease in radial loop pattern in left index fingertip in group B as compared to group A.
3. Graph no.3: Showing Significant decrease in Radial loop in left index in group B.
3. Significant decrease in simple whorl pattern on left ring fingertip in group B as compared to group A.
4. Significant increase in simple whorl pattern in right thumb in Group B as compared to group A.

Discussion

Recent epidemiological data indicates that there is a sharp increase in number of cases of OSF in India the reason being an upsurge in popularity of

commercially prepared areca nut preparations and its increased uptake by young people [10].

Available data suggest that the main causative agent for OSF is the habit of using areca nut But research has been shown that patients presenting with OSF who do not report having an areca nut habit This further adds to the mystery surrounding OSF and its etiology [7]. A genetic component is assumed to be involved in OSF patients with increased frequency of HLA –A10, HLA B7 and HLA-DR3 reported in patients without history of betel nut chewing [11].

As no effective medical or surgical treatment is available for OSF it is desirable to predict the occurrence of OSF in subjects with history of Guthka chewing habits as OSF is associated with 3-19%rate of transformation to malignancy [12]. Dermatoglyphics serves as a tool to describe, compare and contrast and to predict occurrences and risks for biomedical events. Once formed they are age and environmental stable, becoming reliable indicator of genetic damage [13]. It is suggested that many genes which take part in control of finger and palmer dermatoglyphic development can also give indication to the development of premalignant lesions and malignancies [14]. Hence identifying persons at high risk for OSMF could be of great value to decrease the incidence of the same.

At present researchers claim that the study of dermatoglyphics is an important diagnostic tool for some diseases, especially ones with an obscure etiology and mysterious pathogenesis [15, 16].

Frequency of	Gupta et al	Kumar et al	Ganvir et al	Tamgire et al	Our study
1.Arches 2. Loop 3. Whorls	Increased Loop(u) increase Decreased (s)	decreased Decreased(u)(r) Increased(s)	predominant	All fingertip patterns equally distributed in both affected and control groups.	All fingertip patterns equally distributed in both affected and control groups.

So this study was aimed to search for a dermatoglyphic marker in guthka chewers for development of OSMF a potential premalignant condition. Considering the association of OSMF with significant morbidity in terms of loss of mouth function and mortality when transformation to malignancy, we planned to study whether any significant dermatoglyphic fingertip pattern variation in chronic gutkha chewers presenting with and without OSF. Our study was compared with other similar studies and arranged in tabulated form for simplification [15,17,18,19].

Finger observed	Tamgire et al	Our study
Thumb	Right: increased simple whorl pattern Left: Increased composite whorl pattern	Right; increased simple whorl pattern Left:No significant change
Index	Right: Decreased composite whorl pattern Left: Decreased radial loop Pattern	Right :No significant change Left: Decreased radial loop pattern
Middle finger	No significant change	No significant change
Ring finger	No significant change	Right :No significant change Left: Decreased simple whorl pattern
Little finger	Right :No significant change Left; 1.Decreased simple whorl pattern 2.Increased composite whorl pattern	Right: Increased composite whorls Left : 1.Decreased simple whorl 2.increased composite whorls

From these various studies tabulated it was seen that statistically significant results found by various authors vary considerably. Our study did not showed any statistically significant variation in Group A and Group B of fingertip patterns taken together from both the right and left hands. These variations in findings were explained by Segura Wan and Barrentes who reported that there is significant interpopulation variation in dermatoglyphic patterns that should be kept in mind before arriving at a definite conclusion [20]. After the individual digitwise split up of fingertip patterns from both the hands were observed and compared with similar study by Tamgire et al with which our study matches approximately [15].

From the above table it is clear that we can predict the occurrence of OSMF in individuals with habit of gutkha chewing by performing Dermatoglyphic

fingertip pattern assessment as our study had shown statistically significant variations in fingertip patterns distribution between pathologic group with history of guthka chewing habit presented with OSMF and control group B with history of guthka chewing without OSMF. There was only one study with individual digit wise split up of fingertip pattern distribution so more studies with larger sample need to be undertaken in the same geographic regions to avoid interpopulation variation to conclude the results.

Conclusion

1. Dermatoglyphics can be used for identification of chronic guthka chewers with a genetic predisposition to develop OSMF the known premalignant lesion.
2. Further studies I this deep seated relationship between chronic guthka chewing habit and genetic predisposition to develop OSMF can give us more valuable clues which would probably help in preventing this disease which is rampant everywhere in India.

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