EXCELLENT PUBLISHERS

International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 4 Number 10 (October-2016) pp. 128-134

Journal home page: http://www.ijcrar.com

doi: http://dx.doi.org/10.20546/ijcrar.2016.410.015

Palmar Dermatoglyphics in Patients with Oral Squamous Cell Carcinoma

Vishwas D. Kadam[1], Prashant Suvarna[2], Lalit Kumar Gade[3] and Sneha H. Choudhary[4*]

[1]Reader, Department of Oral Medicine and Radiology, C.S.M.S.S. Dental College and Hospital, Kanchanwadi, Aurangabad, Maharashtra, India
[2]Professor, Department of Oral Medicine and Radiology, People's Dental College and Hospital, Bhopal, Madhya Pradesh, India
[3]Senior Lecturer, Department of Oral Pathology, C.S.M.S.S. Dental College and Hospital, Kanchanwadi, Aurangabad, Maharashtra, India
[4]Dentist, Private Dental Clinic, Kolkata, West Bengal, India

Corresponding author

KEYWORDS

Dermatoglyphics,
finger print,
palmar print,
OSCC,
Whorl.

A B S T R A C T

The dermal ridges are genetically determined and influenced by environmental forces that are operating before birth. Several studies have shown association between dermatoglyphics and different types of cancer. To study and analyse the finger & palm print patterns of patients with oral squamous cell carcinoma (OSCC) & individuals (as control group) with tobacco & related habits but without any tobacco induced lesions. Study sample comprised of two groups having 30 patients each, one group consisted of patients with OSCC and the other of control patients. Finger and palm prints were collected using Ink method from 30 patients with OSCC, 30 healthy patients (controls) and were evaluated qualitatively and quantitatively. "Variance Test" and "Chi-square Test" Arches and loops were found more commonly in OSCC patients while whorls were observed more commonly in control group. It is very true that the patients who have habits are susceptible to oral cancer but for those patients who develop this dreadful disease without any cause or habit, an attempt can be made to study the palmar dermatoglyphics and intercept the impending disease and this can prove worthy to save lives.

Introduction

The branch of dermatoglyphics involves the study of fine patterned dermal ridges on digits, palms and soles of all the primates. Cummins and Midlo (1926) coined the term dermatoglyphics (derma = skin; glyphics= carvings) (Schaumann and Alter, 1976). Several studies provide evidences indicating a causal relationship between

tobacco (smoking and non-smoking) and oral squamous cell carcinoma (OSCC) (Warnakulasuriya *et al*., 2005). It is noteworthy to see that though a large spectrum of individuals are indulged in tobacco related habits, however, only a fraction of those people develop OSCC (Jussawalla and Deshpande, 1971).

Substantial evidence also suggests that the carcinogenic process is driven by the interaction between exposure to exogenous carcinogens and inherent genetic susceptibility. In response to environmental exposures, genetic damage accumulates more quickly in individuals with genetic susceptibility to DNA damage than in those without such instability but with a similar exposure. Consequently individuals with genetic instability might be at a greater risk for developing OSCC (Cloos *et al*., 1996). Most dermatoglyphic traits develop in utero during weeks 17 through 24 and remain unchanged during an individual's lifetime (Scully *et al*., 2000). Widespread interest in epidermal ridges developed only in the last several decades when it became apparent that many patients with chromosomal aberrations had unusual ridge formations. Therefore, analyses of dermatoglyphic traits can provide information on intrauterine disturbances and possibly even genetic abnormalities (Sato *et al*., 2000). Host susceptibility must therefore play a pivotal role. Genetically determined differences among these individuals would explain the susceptibility (Buch *et al*., 2002).

The current state of medical dermatoglyphics is such that the diagnosis of some illnesses can now be done on the basis of dermatoglyphic analysis alone. Further, through decades of scientific research, the hand has come to be recognized as a powerful tool in the diagnosis of psychological, medical and genetic conditions (Lynch *et al*., 1974).

This study was undertaken to study and analyze the finger & palm print patterns of patients with OSCC & healthy individuals (as control group) with tobacco & related habits but without any tobacco induced lesions. The aim of the study was to determine whether a specific dermatoglyphics pattern exist in patients with OSCC which would help us in predicting the probability of occurrence of OSCC. From these specific dermatoglyphic patterns an attempt can be made to identify the high risk patients with habits and similar patterns so that early preventive measures can be instituted in these susceptible individuals in order to prevent occurrence of OSCC.

Subjects and Methods

Patients for the study were selected from regular outpatient department of Oral Medicine and Radiology. The study was approved from the ethical committee of the institution. The participants were explained about the study and then included with an informed consent. Study consisted of 2 groups, one group of 30 patients with OSCC and the other control group of 30 healthy individuals with habits but without any tobacco induced lesions. Patients with congenital or acquired deformities of palm and fingers, any scar or wound on the palm and fingers or any skin disease were excluded from the study.

Method of recording dermatoglyphic prints: The finger & palm prints were taken using black duplicating ink on A4 size paper by ink method. The finger impressions of each of the five fingers, i.e., thumb, index, middle, ring, and little fingers of both the hands were taken. These are referred to as

"rolled" impressions because fingers are rolled from one side of fingernail to the other in order to obtain all available ridge detail. The impressions of both the palms are taken without rolling, printing at a 45 degree angle. These are referred to as "plain", "slapped" or "flat" impressions. (Walker, 1957) Dermatoglyphic pattern configurations that were recorded and studied are shown in the Fig. 1 to Fig. 7. (Galton, 1982; Penrose, 1971; Cummins, 1961)

The finger and palm print patterns were analysed qualitatively and quantitatively as:

A) Qualitative analysis

a) Finger tip patterns could be:

1. Arch (A) (Fig. 1)
2. Loops- radial (L^R) (Fig. 2) or ulnar (L^U) (Fig. 3)
3. Whorl (W) (Fig. 4)

b) Palmar patterns were studied as:

1. Thenar/First/I_1 interdigital area (Fig. 5)
2. I_2, I_3 and I_4 interdigital area (Fig. 5)
3. Hypothenar area (Fig. 6)

B) Quantitative analysis

1. Total Finger Ridge Count (TFRC).
2. ab ridge count (Fig. 7)
3. atd angle (Fig. 8)

"Variance Test" was used for quantitative analysis and "Chi Square Test" was used for qualitative analysis.

Results and Discussion

Comparative evaluation was done between the 300 finger prints of patients with OSCC and 300 finger prints of patients in control group and it was found that Loops were found with increased frequency in patients with OSCC (68.66%) whereas Whorls were found more commonly in patients in control group (58.66%). Though the frequency of arches was low, comparatively in both the groups, they were found with increased frequency in patients with OSCC (2.66%) with the p-value of 0.001, which is statistically quite significant. (Table 1)

The dermatoglyphic patterns studied in the hypothenar areas of both the hands in the two study groups showed no significant differences. The most commonly observed hypothenar pattern was arch ulnar, which was equally distributed in the two groups and was statistically insignificant. The dermatoglyphic patterns studied in the thenar/I_1 areas of both the hands in the two study groups showed no significant differences. The dermatoglyphic patterns studied in the I_2, I_3, and I_4 area patterns in both hands showed a decreased frequency of loops in patients with OSCC as compared to the control group with the p-value of 0.114. (Table 2) There was no significant difference in TFRC, mean ab count and mean atd angle between the two study groups. (Table 3)

Qualitative analysis of palmar dermatoglyphic features of patients with OSCC and control group as compared with earlier studies revealed the following findings:

Finger Print Patterns: Atasu and Telatar (1968) found that there were significantly more ulnar loops and fewer radial loops and whorls in the sum of the patterns of the ten fingers in the cancer patients. Elluru Venkatesh *et al.,* (2009) found that arches and loops were more frequent in patients with OSCC than in controls whereas whorls were more frequent in control group. In the

present study also there was increased frequency of arches and loops in patients with OSCC as compared to controls and Whorls were more frequently seen in controls than in patients with OSCC. (Table 1)

Palmar Print Patterns

Thenar and Hypothenar areas: Atasu and Telatar (1968) found that there was no significant difference between the two groups in the patterns of the right and left thenar and hypothenar areas. Elluru Venkatesh *et al.*, (2009) found that the most commonly observed hypothenar pattern was arch ulnar, which was equally distributed in all the three groups and was statistically insignificant. In the present study also, the most commonly observed hypothenar pattern was arch ulnar, which was equally distributed in both the study groups but was statistically insignificant. Thenar/I_1 area pattern, when compared in the two study groups revealed no significant differences. (Table 2)

I_2, I_3, I_4 area patterns: Elluru Venkatesh *et al.*, (2009) observed that there was an increased frequency of loops in controls as compared to patients with oral leukoplakia and OSCC with the p-value of 0.011. Similarly in the present study, I_2, I_3, I_4 area patterns, when compared in both the groups revealed lower loop count in the I_2, I_3, and I_4 areas in patients with OSCC as compared to the control group (Table 2).

The **quantitative analysis** revealed the following findings:

Table.1 Frequency of Finger Print Patterns in the two study groups

PATTERN	OSCC (n=30)	CONTROL GROUP (n=30)	X^2	P
Arches	8 (2.66%)	2 (0.66%)	101.536	0.001
Loops	206 (68.66%)	122 (40.66%)		
Whorls	86 (28.66%)	176 (58.66%)		

Table.2 Frequency of hypothenar pattern, Thenar /I1 pattern and I2, I3, and I4 area pattern in the two study groups

		OSCC (n=30)	Control group (n=30)	X^2	P
Hypothenar pattern	Right	20(66.66%)	22(73.80%)	1.746	0.302
	Left	18(60.00%)	22(73.80%)		
Thenar / I_1 pattern	Right	22(73.30%)	27(90.00%)	1.869	0.374
	Left	25(83.80%)	23(76.67%)		
I_2, I_3, and I_4 area pattern	Right	46(51.11%)	41(45.55%)	1.745	0.114
	Left	39(43.33%)	49(54.44%)		

Table.3 ab Count, atd angle and Total Finger Ridge Count

		RIGHT HAND				LEFT HAND			
		Mean	SD	F	P	Mean	SD	F	P
ab count	OSCC (n=30)	41.93	6.42	1.173	0.381	44.26	7.97	1.951	0.342
	Control (n=30)	41.1	6.02			44.16	7.86		
atd angle	OSCC (n=30)	40.95	4.77	0.554	0.678	42.85	5.13	0.612	0.756
	Control (n=30)	40.11	4.43			40.83	4.62		
Total finger ridge count	**BOTH RIGHT AND LEFT HAND**								
	OSCC (n=30)	140.8	41.11	1.917	0.238				
	Control (n=30)	193.3	56.33						

Fig. 1: Radial Loop

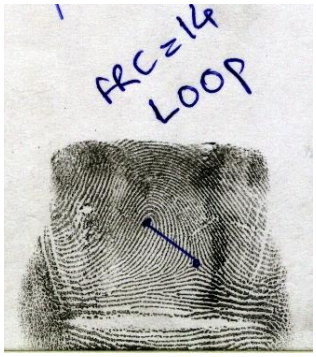

Fig. 2: Ulnar Loop

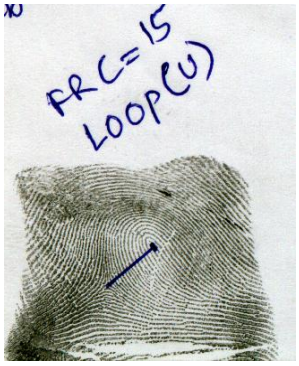

Fig. 3: Whorl

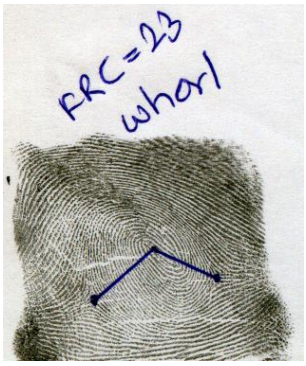

Fig. 4: Arch

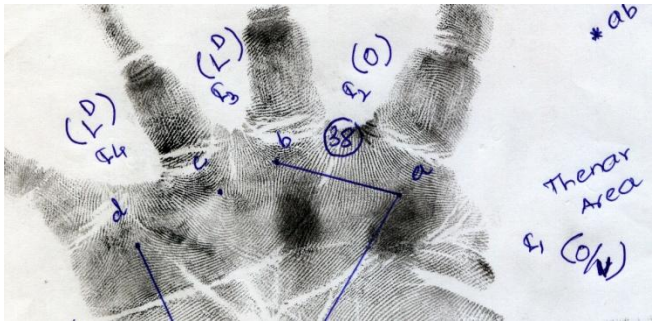

Fig. 5: Thenar, Hypothenar, I_1 I_2 I_3 I_4 areas

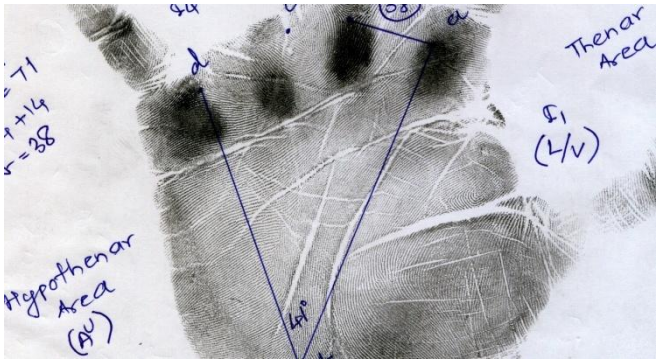

Fig. 6: Thenar, Hypothenar, I_1 I_2 I_3 I_4 areas

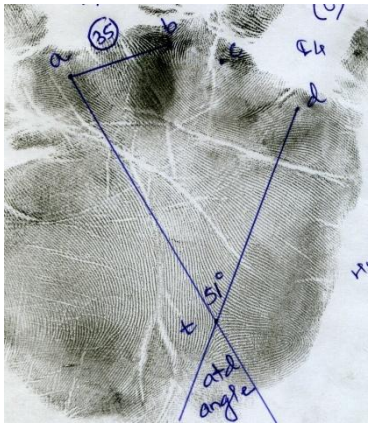

Fig. 7: atd Angle

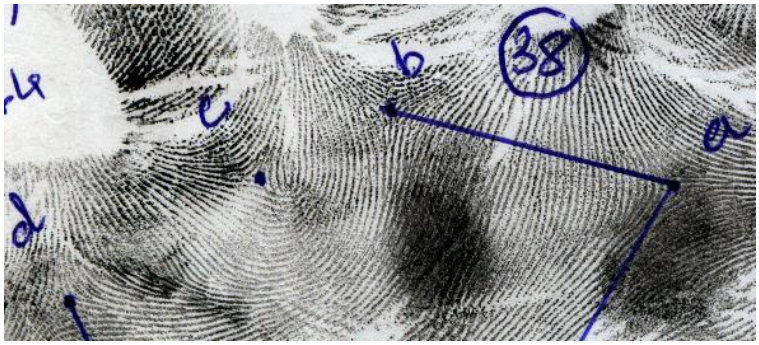

Fig. 8: atd Angle

Total Finger Ridge Count (TFRC): Fuller IC. (1973) suggested that the mean ridge counts of the cancer patients on the right index and ring and left middle and ring fingers were lower than those of all the other groups studied, the difference being significant. In addition, the total ridge count was lower, however the differences did not reach significance. In the present study, the mean TFRC was less in patients with OSCC when compared with the control group. The TFRC however did not show any significant difference (Table 3).

ab count: Fuller IC. (1973) found no significant differences in the variance of ab ridge counts. Elluru Venkatesh *et al.*, (2009) also found no significant difference in ab count between the groups. Similarly in the present study, the ab count when compared in the two study groups revealed no significant differences. (Table 3)

atd angles: Fuller IC. (1973) found that the mean angle on the right hand was significantly larger in the cancer group than in the others and that the differences were significant. However in the present study, the atd angles, when compared among two study groups revealed no significant differences. However, the mean atd angle was slightly larger in patients with OSCC than in control group. (Table 3)

Conclusion

Very few dermatoglyphic studies have been carried out in relation to oral malignancy,

hence more and more studies with larger sample sizes need to be undertaken to conclude the results significantly. Due to the relative ease with which the dermatoglyphics can be studied both qualitatively and quantitatively, it can be an important research tool in the field of medicine and genetics.

Acknowledgement

We are grateful to all the subjects who volunteered for the study.

References

Atasu, M., Telatar, H. 1968. Cancer and dermatoglyphics. *Lancet*, 20: 861.

Buch, S.C., Notani, P.N., Bhisey, R.A. 2002. Polymorphism at GSTMI, GSTM3 and GSTTI gene loci and susceptibility to oral cancer in an Indian population. *Carcinogenesis*, 23: 803-7.

Cloos, J., Spitz, M.R., Schantz, S.P., Hsu, T.C., Zhang, Z.F., Tobi, H. *et al*. 1996. Genetic susceptibility to head and neck squamous cell carcinoma. *J. Nat. Cancer Institute*, 88: 530-5.

Cummins, H. and Midlo, C. 1961. finger prints, palms and soles. New York: Dover.

ElluruVenkatesh, *et al*. 2008. Palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma patients, *IJOMR*, 20(3): 94-9.

Fuller, I.C. l973. Inherited predisposition to cancer: A dermatoglyphic study. *Br. J. Cancer*, 28:186.

Galton, F. 1982. Finger prints. London: McMillan.

Jussawalla, D.J., Deshpande, V.A. 1971. Evaluation of cancer rise in tobacco chewers and smokers: An epidemiologic assessment. *Cancer*, 28: 244-52.

Lynch, H.T., Kaplan, A.R., Moorhouse, A., Krush, A.J., Clifford, G. 1974. Dermatoglyphic peculiarities in members of high-cancer-risk kindred. *Prog. Exp. Tumor. Res.*, 19: 325-32.

Penrose, L.S. 1971. Finger prints and palmistry. *The Lancet*, 2: 1239-42.

Sato, M., Sato, T., Izumo, T., Amaga, T. 2000. Genetically high susceptibility to oral squamous cell carcinoma in terms of combined genotyping of CYPIAI and GSTMI genes. *Oral Oncol.*, 36: 267-71.

Schaumann, B., Alter, M. 1976. Dermatoglyphics in medical disorders. New York: Springer Verlag.

Scully, C., Field, J.K., Tanzawa, H. 2000. Genetic aberrations in oral or head and neck squamous cell carcinoma (SCCHN): Carcinogen metabolism, DNA repair and cell cycle control. *Oral Oncol.*, 36: 256-63.

Walker, N.F. 1957. Ink method of finger, palm,sole printing. *J. Paediatr.*, 50: 27.

Warnakulasuriya, S., Sutherland, G., Scully, C. 2005. Tobacco, oral cancer and treatment of dependence. *Oral Oncol.*, 41: 244-60.

How to cite this article:

Vishwas D. Kadam, Prashant Suvarna, Lalit Kumar Gade and Sneha H. Choudhary. 2016. Palmar Dermatoglyphics in Patients with Oral Squamous Cell Carcinoma. *Int.J.Curr.Res.Aca.Rev.*4(10): 128-134. doi: http://dx.doi.org/10.20546/ijcrar.2016.410.015