ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 12, pp.76413-76416, December, 2018

DOI: https://doi.org/10.24941/ijcr.30190.12.2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

A COMPARATIVE EVALUATION BETWEEN ORAL LEUKOPLAKIA PATIENTS, ORAL SQUAMOUS CELL CARCINOMA PATIENTS AND HEALTHY INDIVIDUALS USING PALMAR DERMATOGLYPHIC PATTERNS

[1]Dr. Varun Rastogi, [2,*]Dr. Nilotpol Kashyap, [3]Dr. Nisha Maddheshiya, [4]Dr. Nishant and [5]Dr. Racchna Sharma

[1]Professor and Hod Department of Oral Pathology, Universal College of Medical Sciences, Bhairhawa, Nepal
[2]Professor and hod, Department of Pediatrics and Preventive Dentistry, Universal College of Medical Sciences, Bhairhawa Nepal
[3]Lecturer, Department of Oral Medicine, Universal College of Medical Sciences, Bhairhawa, Nepal
[4]Lecturer, Department of Oral Pathology, Universal College of Medical Sciences, Bhairhawa, Nepal
[5]Reader, Department of Oral Pathology

ARTICLE INFO

Article History:
Received 15th September, 2018
Received in revised form
14th October, 2018
Accepted 19th November, 2018
Published online 31st December, 2018

Key Words:
Heart rate variability,
Isometric hand grip,
Essential hypertension.

ABSTRACT

Dermatoglyphics is an art and science of fingerprints which involves the study of fine dermal ridge pattern and configuration of digits, palms and soles. It was derived from Latin words "derma" means skin and "glyphics" means carvings. The term "Dermatoglyphics" was coined by Cummins and Midlo (1991). Dermatoglyphics may be of immense clinical implication to separate those persons who are at a higher risk for developing oral leukoplakia and oral squamous cell carcinoma at early stage. The present study on palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma has few significant parameters. Depending on the results following conclusions have been drawn from our study. Significant findings in patients with oral leukoplakia and oral squamous cell carcinoma in both hands:

- Increase in frequency of arches.
- Increase in frequency of loops.
- Decrease in frequency of whorls.
- Increase in frequency of loops in I2, I3, I4 area.

No significant difference was observed in the following findings in both hands:

- Hypothenar pattern.
- Thenar/I1 area pattern.
- Total finger ridge count
- atd angle.
- ab count.

Thus these findings would help us to identify an individual with or at risk for developing oral leukoplakia and oral squamous cell carcinoma. So that high risk individuals can be identified and preventive measures can be instituted at the earliest to prevent the occurrence of oral leukoplakia and oral squamous cell carcinoma. Subject Area: Oral Pathology.

***Citation: Dr. Varun Rastogi, Dr. Nilotpol Kashyap, Dr. Nisha Maddheshiya, Dr. Nishant and Dr. Racchna Sharma*, 2018.** "Heart rate variability due to isometric hand grip on childrens of hypertensive parents", *International Journal of Current Research*, 10, (12), 76413-76416.

INTRODUCTION

Dermatoglyphics is an art and science of fingerprints which involves the study of fine dermal ridge pattern and configuration of digits, palms and soles (Cummins *et al*., 1961). It was derived from Latin words "*derma*" means skin and "*glyphics*" means carvings. The term "Dermatoglyphics" was coined by Cummins and Midlo (1991) (Ramani *et al*., 2011).

Corresponding author: **Nilotpol Kashyap,**
Professor and hod, Department of Pediatrics and Preventive Dentistry, Universal College of Medical Sciences, Bhairhawa Nepal.

Since past few decades, role of dermatoglyphic pattern as genetic markers in dental science has sought an inquisitive attention to different researchers across the globe. It is well known that genetics plays an imperative role in defining the palmar dermatoglyphic patterns and each individual possess a unique fine ridge pattern in palm and sole. Oral leukoplakia is a malignant lesion and contributing cause of one third of all oral cancer (17-35%) (Preus, 1972). In the recent years, steady increase in incidence of oral cancer has been perceived and at present, it ranks fifth in the global cancer burden (Tamgire *et al*., 2013).

In India, Oral squamous cell carcinoma (SCC) ranks first among all cancers in men and as number three, among cancers in women (Prime *et al*., 2001). Based on available studies, it was established that, the chewing of gutkha and use of tobacco (smoking and non-smoking) is an important risk factor for SCC (Atasu *et al*., 1968). However, non- tobacco users and non-smokers were also suffer from SCC (Fuller, 1973). Occurrence of oral squamous cell carcinoma among non-tobacco users was largely attributed to genetic predisposition and variability amongan individual (History of Dermatoglyphics, 2016). There are a number of cytogenetic markers were identified to detect the SCC. However, these cytogenetic studies are mostly expensive and require sophisticated techniques and instruments. So, dermatoglyphics may be of immense clinical implication to separate those persons who are at a higher risk for developing such diseases at early stage. Major advantages of dermatoglyphics as a tool to the diagnosis of dental disorders could be:-

- Permanent impressions of ridge patterns can be recorded through a cheap, rapid, and non- invasive procedure to the patient.
- The complete development of epidermal ridge patterns on hands and soles usually takes place in 14 weeks after birth and remain unchanged in the lifetime.

Aim: To identify the dermatoglyphic features in oral leukoplakia, oral squamous cell carcinoma and comparative evaluation with healthy individuals in the study population.

MATERIALS AND METHODS

Present study was a hospital based comparative study (case control study). All the study participants were recruited from the patients visiting to Outpatient department The study participants, who fulfill the inclusion criteria was provided with the detailed information about the study and subsequently, a written informed consent was obtained. Purposive sampling was done and a total of 90 patients were recruited. These study participants were divided equally into three groups based on defined criteria.

Group I: 30 Patients with oral leukoplakia

Group II: 30 patients with oral squamous cell carcinoma.

Group III: 30 Healthy patients

Patients who had

- Clinically and histologically proven Oral leukoplakia patients were selected.
- Clinically and histologically proven Oral squamous cell carcinoma patients were selected.
- For control group -Patients without any oral mucosal lesions who were able to cooperate for the study and who were not suffering from any other known systemic diseases were selected.

Patients with compromised physical dexterity and mentally challenged individuals were not selected for the study. Firstly, sweat, oil and dirt from the skin was removed by washing the ridged areas with soap and water followed by drying. This usually enhances the quality of dermatoglyphic prints. Then ink was uniformly spread over the palm and fingers. Prints of fingertip were taken first followed by that of the palm, on the paper kept over the table. Once the satisfactory prints were obtained of the fingers and palms, the patient was instructed to wash their hands with soap and water. Then the finger and palm prints were analyzed qualitatively and quantitatively. Fingertip patterns and palmar patterns were studied under qualitative analysis. Three type of Fingertip patterns were studied

- Arches (A)
- Loops (L) - recorded as ulnar or radial depending on the side on which it opened.
- Whorls (W)- recorded as simple and double loop whorls (Wdl)

Three palmar patterns were studied as:

- Hypothenar area
- Thenar / First inter-digital area.
- I2, I3 and I4 inter-digital area.

Quantitative analysis was done under the following headings.

- ab ridge count,
- Finger ridge count
- Total finger ridge count (TFRC).
- atd angle.

Ridge was counted along a straight line connecting from the triradii to the point of core. Symbols and ridge counts were recorded in order, beginning from first digit of right hand to the fifth digit and from first digit of left hand to fifth digit of same hand. The total finger count was derived by adding the ridge counts on all ten fingers. Only the larger count was used on those digits with more than one ridge count. ab ridge counting is done according to the same principles used for ridge counting on the digits between triradii a and b over the palm. The atd angle was recorded by drawing lines from the digital triradius a to the axial triradius ‘t’ and from this to the digital triradius ‘d’.

Statistical analysis: All the data was entered in Microsoft excel 2010 and statistical analysis was performed in SPSS 16 version. All the categorical variables were expressed as count (percentages) and continuous variables were expressed as mean (±standard deviation). To compare the difference between the group’s chi square test and t test was performed. P value < 0.05 was considered statistically significant.

RESULTS

The present study was undertaken to compare the palmar dermatoglyphics in patients with oral leukoplakia, oral squamous cell carcinoma and control group. The study included 30 individuals in each group after obtaining informed consent for participation in the study. Among oral leukoplakia patients 27 (90%) were males and 3 (10%) were females with an age range of 15 years to 58 years, mean age being 40.9 years ± 11.91 standard deviation. Similarly among OSCC patients 19 (63.3%) were males and 11 (26.7%) were females with an age range of 24 to 79 years, mean age being 47.03 years ± 11.91 standard deviation. All the subjects enrolled in the study were using tobacco either in smoke or smokeless form. The data obtained from analyzing the finger and palm prints were tabulated, P value was calculated and the results

obtained were tested for statistical significance. It was found that in the distribution of various finger print patterns in patients with oral leukoplakia 6.30% had arches, 6.30% had loops and 30.7 % had whorls.In the distribution of various finger print patterns in patients with oral squamous cell carcinoma, 7 % had arches, 60.7% had loops and 32.3% had whorls.In the control group 2 % had arches, 3 % had loops and 68% had whorls.In patients with oral leukoplakia and oral squamous cell carcinoma, there was an increased frequency of arches and loops whereas in control group, there was an increased frequency of whorls. P value is less than 0.001, which is statistically significant. There was an increased frequency of loops in controls as compared to patients with oral leukoplakia and oral squamous cell carcinoma. "P" value is 0.011, which is statistically significant.

DISCUSSION

The term dermatoglyphics (skin casings) was coined in 1926 (Cummins and Midlo) to describe what until then had been referred to as epidermal ridge configurations (Mglinets, 1991). These epidermal ridges begin to develop about the 13th week of prenatal life, as the fetal mounds on the digit tips, interdigital, thenar and hypothenar areas of the hand and the corresponding areas of the foot begin to regress. The pattern formation is complete by the 19th week and once formed do not change during the rest of prenatal and postnatal life (Cummins, 1961). The dermal ridge patterns are strongly, but not exclusively, governed by heredity. Studies on inheritance of dermatoglyphics by qualitative and quantitative methods have shown great resemblance among monozygotic twins and reasonably strong inheritance among siblings and parents. Because of the great diversity in the types and combinations of patterns found on the fingers, palms and soles, it is evident that the formation of the dermal ridges would be determined by many genes spread over many chromosomes. Dr. Harold Cummins in 1936 examined several children with trisomy 21 (Down's syndrome) and found consistent dermatoglyphic changes that were absent among controls. This earth-shattering discovery helped to move the budding science of dermatoglyphics from a place of obscurity to being acceptable as a diagnostic tool among medical personnel. Since then widespread interest in epidermal ridges developed in medical field since it became apparent that many patients with chromosomal aberrations had unusual ridge formations. Inspection of skin ridges, therefore seemed promising,simple, inexpensive means for determining whether a given patient had a particular chromosomal defect (Elluru, 2008). Unusual ridge configurations have been observed to exist not only in patients with chromosomal defects but also in patients with single gene disorders and in few in whom the genetic basis of the disorder is unclear (Cummins, 1961).

With an ever growing population it becomes imperative that methods be developed to identify individuals either at risk for or already having a given illness in the most cost-efficient manner without sacrificing quality of care. While such an imperative is not a new concept, the use of dermatoglyphics is rather a unique approach at low cost for identifying such individuals. In examining dermatoglyphics and cancer patients in general, one of the studies has noted an increase in whorls and a decrease in radial loops in 201 Turkish cancer patients. which is not in accordance with our study which may be due to the samples were from different Race. Our results are in accordance with the study of E. Venkatesh *et al* (2008).

Another study with different cancers found more whorls to be present and in studying high risk kindred also found more whorls. Yet another study found an increased proportion of ulnar loops in cancer patients. Tobacco and alcohol are established risk factors for oral leukoplakia and oral squamous cell carcinoma, substantial evidence also suggest 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 this lesions (Atasu, 1968).

It is suggested that many genes which take part in the control of dermatoglyphics of human which may also give indication to the development of premalignancy and malignancy, hence identifying persons at high risk for oral leukoplakia and oral squamous cell carcinoma with regards to dermatoglyphics could be of great value to decrease the incidence of the same, a finding reiterated by Penrose in 1969. Considering the high mortality and high morbidity rate due to oral cancer in India we planned to assess palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma and find whether a correlation exists between oral leukoplakia, oral squamous cell carcinoma and palmar dermatoglyphics. The qualitative analysis of palmar dermatoglyphic features of patients with oral leukoplakia, oral squamous cell carcinoma and control group revealed the following findings:

Finger Print Patterns: In the present study the frequency of the finger print patterns in all the three study groups was significant. There was increased frequency of arches and loops in patients with oral leukoplakia and oral squamous cell carcinoma as compared to controls. Whorls were more frequently seen in controls than in oral leukoplakia and oral squamous cell carcinoma. The analysis of palmar pattern revealed following findings.

Hypothenar Area: Hypothenar pattern, when compared in all the three groups revealed no significant differences.

Thenar / I1, Area: Thenar / I1, area pattern, when compared in all the three groups revealed no significant differences. I2, I3, I4 are pattern. Loops were most common in controls in the I2, I3, I4 areas as compared to the patients with oral leukoplakia and oral squamous cell carcinoma. The quantitative analysis revealed the following findings.

Total finger ridge count: No significant difference was observed in the mean TFRC between the three study groups.

AB Count: There was no significant difference in the mean ab count between the three groups.

ATD angles: atd angles when compared among the three study groups presented no significant differences. These differences in the dermatoglyphic patterns being genetic markers raise the possibility of detecting those who are predisposed to develop oral leukoplakia and oral squamous cell carcinoma. Hardly anydermatoglyphic study has been carried out in relation to oral malignancy, hence more studies with larger sample need to be undertaken to conclude the results.

Conclusion

The present study on palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma has few significant parameters. Depending on the results following conclusions have been drawn from our study. Significant findings in patients with oral leukoplakia and oral squamous cell carcinoma in both hands:

- Increase in frequency of arches.
- Increase in frequency of loops.
- Decrease in frequency of whorls.
- Increase in frequency of loops in I2, I3, I4 area.

No significant difference was observed in the following findings in both hands:

- Hypothenar pattern.
- Thenar/I1 area pattern.
- Total finger ridge count
- atd angle.
- ab count.

Thus these findings would help us to identify an individual with or at risk for developing oral leukoplakia and oral squamous cell carcinoma. So that high risk individuals can be identified and preventive measures can be instituted at the earliest to prevent the occurrence of oral leukoplakia and oral squamous cell carcinoma. This further proves that oral leukoplakia and oral squamous cell carcinoma are not just an environmentally acquired but their roots are deep seated in the soil of genetics. Furtherresearch into the relation between oral leukoplakia, oral squamous cell carcinoma and genetics can give us more valuable clues which would probably help in preventing these diseases and free the mankind from these menacing diseases which are rampant everywhere particularly now. Thus, fight oral leukoplakia and oral squamous cell carcinoma with genes can be the slogan of the better today and tomorrow.

REFERENCES

Cummins H., Midlo C. 1961. Fingerprints, Palms and Soles: An Introduction to Dermatoglyphics. New York: Dover Press; p. 319.

Ramani P., Abhilash PR., Sherlin HJ. *et al*. 2011. Conventional Dermatoglyphics-Revived Concept: A Review. *International Journal of Pharma and Bio Sciences* July-September; 2(3): B446-B458.

Preus M., Fraser F. 1972. Dermatoglypics and syndromes. *Amer J Dis Child.,* 24:933-43

Tamgire, DW., Fulzele RR., Chimurkar VK., Rawlani SS., Sherke AR. 2013. Qualitative Dermatoglyphic Analysis of Finger Tip Patterns In Patients Of Oral Sub Mucous Fibrosis, IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) Volume 6, Issue 5 (May.- Jun), PP 24-27.

Prime SS., Takker NS., Pring M., Guest PG., Paterson IC. 2001. A review of inherited cancer syndromes and their relevance to oral squamous cell carcinoma. *Oral Oncol.,* 37: 1-16.

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

Fuller IC. 1973. Inherited predisposition to cancer: A dermatoglyphic study. *Br. J Cancer.,* 28: 186-9.

History of Dermatoglyphics. Available fromhttp://www.iamiindia.com/dermatoglyphics.php. Accessed on 22/01/2016.

Mglinets V. 1991. "Relationship between dermatoglyphic variability and finger length in genetic disorders: Down's syndrome". Genetika 27 (3): 541–7.

Lugassy, Jennie, *et al*. 2006. "Naegeli-Franceschetti-Jadassohn syndrome and dermatopathiapigmentosareticularis: two allelic ectodermal dysplasias caused by dominant mutations in KRT14." The American Journal of Human Genetics 79.4:724-730.

Elluru V., Bagewadi A., Keluskar V., Shetti A. 2008. Palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma patients. *Journal of Indian Academy of Oral Medicine and Radiology.* 20:94-99

Tamgire DW., Fulzele RR., Chimurkar VK., Rawlani SS., Sherke AR. 2013. Qualitative Dermatoglyphic Analysis of Finger Tip Patterns In Patients Of Oral Sub Mucous Fibrosis, IOSR *Journal of Dental and Medical Sciences* (IOSR-JDMS) Volume 6, Issue 5, PP 24-27.

David MP., Sinha P. 2015. Dermatoglyphic patterns in subjects with potentially malignant disorders and oral carcinoma. *J AdvClin Res Insights.,* 2:7-11.

Gupta A., Karjodkar FR. 2013. Role of dermatoglyphics as an indicator of precancerous and cancerous lesions of the oral cavity. *Contemporary Clinical Dentistry,* 4(4):448- 453

****