

Review Article

Dermatoglyphic pattern as a genetic marker and alteration in serum lipid profile as a screening tool in premalignant lesions and conditions and oral cancer:A Review Article

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Abstract: Oral cancer, also known as mouth cancer, is a type of head and neck cancer and is any cancerous tissue growth located in the oral cavity. It may arise as a primary lesion originating in any of the tissues in the mouth, by metastasis from a distant site of origin, or by extension from a neighboring anatomic structure, such as the nasal cavity. Oral cancer is a carcinoma that occurs in the oral cavity and belongs to the group of head and neck tumors. Malignant oral cavity tumors account for about 3-5% of all tumors. The most common type is squamous cell carcinoma that makes up 90% of all malignant tumors. The main etiologic factors for the development of oral cavities cancers are smoking, alcohol consumption, sun exposure, liver cirrhosis, dietary deficiencies, viruses, chronic tooth injuries, etc Although the oral cavity is accessible for visual examination, oral cancers are generally diagnosed late. Lack of awareness in patients and the phase of negation and ignoring the symptoms are the reasons for not seeing a doctor right away, and is considered the “*first loss of time*”. The “*second loss of time*” occurs due to lack of awareness of medical and dental professionals and the lack of a timely diagnosis. The “*third loss of time*” is the period that passes from the diagnosis to the commencement of treatment. It is important to reduce the “*first loss of time*” by increasing awareness of the importance of self-examination, and to shorten the “*second loss of time*” through education of medical and dental staff.

Keywords: Oral cancer, dermatoglyphics, cancer detection.

INTRODUCTION

Oral Cancer (OC) is the sixth most common cancer in the world (Day, T.A. *et al.*, 2003). Despite intensive efforts throughout the world, cancer still remains an enigma. The Head and neck cancer accounts for 30- 40% of all malignant tumors in India and the most common malignant neoplasm is Oral Squamous Cell Carcinoma (OSCC). The incidence & mortality rate of OC is still unacceptably high. By the time it is diagnosed, OC often is far advanced and deadly. These deaths are particularly tragic because, in most cases, they can be prevented with early diagnosis and treatment (NIH fact sheets <http://report.nih.gov>). Early detection of these lesions can dramatically improve the treatment outcome and prognosis in such patients.

Determination of palmer dermatoglyphic patterns and change in lipid levels may have a diagnostic or prognostic role in the early diagnosis and treatment of oral premalignant and malignant lesions.

The word dermatoglyphics comes from two Greek words (derma, skin and glyphe, carve) and refers to the friction ridge formations which appear on the palms of the hands and soles of the feet (Jatti, D. *et al.*, 2014). Dermatoglyphics is the scientific study of fingerprints, lines, mounts, and shapes of hands. The term was coined by Dr. Harold Cummins, the father of American fingerprint analysis (Umana, U. *et al.*, 2013).

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Genetics plays an important role in determination of palmer dermatoglyphic patterns. After the complete formation of patterns, they are unaffected by the environment. This explains their unique role, as an ideal marker for individual identification and as well as detection of defects due to intra uterine irregularities in early weeks of pregnancy. Most dermatoglyphics are correlated with genetic abnormalities and are useful in biomedical studies. It plays an important role in the diagnosis of chromosomal disorders. Dermatoglyphics has revealed its significance in Down's syndrome, Turner's syndrome or klinefelter's syndrome, Trisomy 18 syndrome and in Rubinstein –Taybi Syndrome (Gupta, A., & Karjodkar, F. R. 2013).

Dermatoglyphic pattern is a genetic marker for identification of people at risk of development of dental caries. The epithelium of finger buds as well as enamel have ectodermal origin and both develop at the same time in I.U life³ It is also a genetic marker in detection of cleft lip, cleft palate, periodontal problems and malocclusion. Different malocclusions are prone to specific type of ridge pattern (Venkatesh, E. *et al.*, 2008). Genetic predisposition is of ample importance for the etiology behind development of oral malignancy in addition to the usage of areca nut and tobacco (Jatti, D. *et al.*, 2014). This genetic susceptibility of an individual can be determined with the help of dermatoglyphics.

Various epidemiological studies support that antenatal disturbances can alter the epithelium to make it susceptible to various carcinogens and such antenatal disturbance if responsible for the disorder should manifest in any prenatal event such as dermal ridge formation (Gupta, A., & Karjodkar, F. R. 2013). Therefore the quantitative and the qualitative analysis of the finger and the palm prints can be used as a genetic marker in individual susceptible to development of oral squamous cell carcinoma.

This method of using dermatoglyphics as a genetic marker is easy to perform as it uses simple measurements and it is also cost effective compared to genetic cytomarkers (Gupta, A., & Karjodkar, F. R. 2013). So individual can be easily convinced for study of dermatoglyphic pattern.

With the help of dermatoglyphic patterns the genetically predisposed individual can be segregated amongst the population at risk and can be appropriately counselled and motivated to change the lifestyle so the role of dermatoglyphics in tobacco cessation cannot be ruled out.

The newly proliferating tumor cells would need many basic components well above the normal limits, used in physiological process. One such component is lipids which form major cell membrane components essential for various biological functions

including cell division and growth of normal and malignant tissues. The increased requirement of lipids to fulfill the need of these new cells would be expected to diminish the existing lipid stores (Kumar, P. *et al.*, 2012). These biochemical studies in evaluation of cancer have shown that various substances alter quantitatively in the serum during tumor development and are referred to as tumor markers. So, if the biochemical changes occur even before frank cancer has occurred, we can predict even in oral precancerous lesions and conditions whether a particular individual with the underlying biochemical defect would develop cancer or not at a later date.

The Knowledge about dermatoglyphics and lipid profile facts can be utilised for the following

- To assess the genetic susceptibility of an individual to develop precancerous and cancerous lesion and condition by using dermatoglyphic pattern.
- To counsel and motivate the subjects with tobacco habit and follow up the same subjects.

CONCLUSION

As Premalignant Diseases and Oral Squamous Cell Carcinoma have a genetic basis, with the knowledge of dermatoglyphic patterns, individuals who are prone to develop these lesions can avoid the trigger factors. The relevance of dermatoglyphics is not for diagnosis, but for prevention, by predicting a disease, and not for defining an existing disease, but for identification of people with the genetic predisposition to develop certain diseases (Venkatesh, E. *et al.*, 2008).

A decreasing serum lipid status in the chronic smokers, especially the LDL can be used as an early indicator for changes in the neoplastic cells. total lipids, cholesterol and HDL cholesterol levels are inversely associated with incidence of cancer whereas triglycerides levels were significantly elevated in cancer patients (Raste, A.S., & Naik, P.P. 2000, oct).

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