OBAT: Jurnal Riset Ilmu Farmasi dan Kesehatan
Volume 3, Nomor 3, Mei 2025
e-ISSN: 3031-0148, p-ISSN: 3031-013X, Hal. 01-08
DOI: https://doi.org/10.61132/obat.v3i3.1225
Available Online at: https://journal.arikesi.or.id/index.php/OBAT

The Dermatoglyphics, Health and Diseases in Last Ten Years' Review

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Abstract. *In the art and science of dermatology, ridge patterns and surface markings are studied on the finger's skin, palm, foot toes, and soles. It is helpful for research into illnesses that may have a hereditary component. Dermatoglyphics has developed into a practical instrument in the fields of biology, anthropology, genetics, medicine, and dentistry over the past few centuries. The state of medical dermatoglyphics today is such that different systemic illnesses are linked to fingerprint patterns. Breast cancer, smokeing tobacco, bronchial asthma, diabetes mellitus, and several others were maintained. The sophisticated and contemporary uses of dermatoglyphics in the diagnosis of various oral, systemic, and dental conditions are covered in this article. It also emphasizes how beneficial dermatoglyphics is as a medical diagnostic tool for a variety of systemic illnesses. An approach to investigating the genetic relationships of oral, craniofacial, and systemic illnesses that is easily accessible, affordable, practical, trustworthy, and noninvasive is dermatoglyphics. Therefore, dermatoglyphics is a great tool for screening the population for numerous medical and dental conditions in addition to providing personal identification.*

Keywords*: Bronchial asthma, Cancer, Caries, Dermatoglyphics, Diabetes Mellitus, Disorders, Finger Prints, Genetics, Hypertension, Medicine, Palm Prints.*

1. INTRODUCTION

In the modern world, fingerprints are considered to be the most trustworthy method of identification. A person's genetic composition is responsible for their fingerprint pattern, which is created during fetal development. Dermal ridges are thought of as a naturally occurring growth in body parts including fingers, palms, toes, and soles. The pattern doesn't change over the passage of a person's life and isn't affected by outside variables. (Patil and Ingle 2021) These areas are primarily the subject of dermatoglyphics research, and they are impacted by genetic and epigenetic variables. (Asen 2019; Teicher 2022) Dermatoglyphics has numerous significant applications in the study of particular congenital and genetic conditions, dentistry, behavioral sciences, criminal research, forensic science, law, and justice. (Tewari et al. 2022) Because no two fingerprints are as well, the characteristics of dermatoglyphics displayed distinct patterns. By identifying different congenital illnesses and genetic problems, the study of dermatoglyphic patterns helps identify other hereditary characteristics. When the fetus is still inside the mother's womb in the very early sixth week, ridges start to form. The fetal hand displays the formation of volar pads, which are the hand patterns determined by the paddle-like patterns. During the thirteenth week, these patterns transform into the skin ridges. (Dorjee et al. 2015; Mouneshkumar et al. 2021) Dermatoglyphics has been widely employed in the

Received: February 09, 2025; Revised: February 25, 2025; Accepted: March 12, 2025; Online Available: March 14, 2025

medical industry as an early warning system for some medical disorders and as a non-invasive diagnostic tool (Wijerathne et al. 2020). In recent years, several doctors have been more interested in the clinical value of dermatoglyphic examination. (Smail, Kareem, and Abdulkareem 2019) The three most significant patterns found in human fingerprints are arches, whorls, and loops. (Sharma and Mathur 2020; Thakur, Yadav, and Tiwari 2019) Fingerprints pushed onto clay tablet contracts from 1792–1750B.C. have been found by archaeologists in Babylon. Using inked fingerprints on all official papers, including contracts and/or loans, was standard procedure in ancient China. (Galton 1892)

Bipolar Affective Disorder

In their study, (Shrivastava et al. 2016) found that the Total Finger Ridge Count (TFRC) and the number of a-b ridge counts decreased in the group of patients with bipolar disorder. The average Atd angle of both hands has been found to be larger than normal in bipolar disorder in comparison to the (Ctrl) group. The recurrence of whorls rose up in patients in comparison to controls (p ($p<0.001$) (Shrivastava et al. 2016).

(Ahmed-Popova 2021) revealed a ultimate incidence of loops and a lower number of finger ridges in male patients with bipolar I disorder and an increased number of finger ridges and a greater occurrence of whorls in female patients with bipolar I disorder compared to same-sex controls. In both sexes, we observed an increase in asymmetry of variable in fingerprint images. In the realm of neurodevelopmental hypotheses of cognitive disruptions, dermatoglyphical features could become trustworthy biological markers for the time scheduling of onset of prenatal harm and the underlying pathogenetic mechanisms. (Ahmed-Popova 2021)

Obese

In the study by (Singh and Singh 2024) among Obese , males were more likely to have whorls on both sides, or the palmer prints of their right and left hands, whereas obese females were more likely to have loops on both sides. Thus, with the aid of cutting-edge research to be conducted in the future and the created hypothetical data being tested, the existence of whorls and loops might be connected with stoutness in boys and women, separately.

(Alberti et al. 2019) reported Given additional lines in the finger of left hand two and a higher frequency of the whorl pattern in people of a in fine fettle weight, the data revealed a predictive marker of obesity, where The frequency of the radial loop pattern

was higher in the overweight group, and the ulnar loop pattern was more frequent in the obese group.

(Patel and Parekh 2024) who participated in this study, the loop pattern was the commonest in hands, followed by the whorl pattern, and the arch pattern was the least common. The left and right hand's individual finger patterns were nearly identical. Whereas the thumbs of obese and overweight individuals had a consistent pattern of loops, the thumbs of people with normal weight displayed whorls.

Dermatoglyphics In Oral Cancer And Potentially Malignant Conditions

In this work was done for the purpose for analyzing the changes in patterns and estimate the benefit of dermatoglyphics among persons identified with possibly malignant conditions and oral cancer. A total of 300 participants were chosen. investigation shows that ill and healthy people have different dermatoglyphic patterns. In particular, persons with OSMF and leukoplakia have a rising percentage of arch patterns and a smaller number of loop patterns. These results imply that dermatoglyphics might be useful in comprehending or diagnosing specific medical disorders. (Kumar et al. 2024)

(Awasthy et al. 2018) found a weak correlation between individuals with OSMF and leukoplakia in their loop pattern, and between patients with OSMF and those without oral lesions in their whorl pattern.

In another study , (Lakshmana et al. 2016) It was discovered that loops were the commonest finger ridge patterns in those affected with oral leucoplakia, OSMF, and OSCC, while whorls were commoner in the (Ctrl) group.

According to a paper by (Lakshmana et al. 2016). regarding the use of digitally and palmarly attested dermatoglyphics in the recent investigation of those affected with oral leukoplakia, oral submucous fibrosis, and oral squamous cell carcinoma .Loops were the most common finger ridge patterns in people having oral leukoplakia, while whorl patterns were detected in controls. (Lakshmana et al. 2017)

In a dermatoglyphic study conducted in 2014, (Ganvir and Gajbhiye 2014) used qualitative assay of finger and palm print patterns to identify genetic predisposition in individuals with OSCC and OSMF .In order to determine the vulnerability of OSMF and OSCC, they had noted in their study that a preponderance of whorl type fingerprint patterns can be employed as a screening marker. (Ganvir and Gajbhiye 2014)

In a research by (Munishwar et al. 2015) on 25 chewers of gutkha with OSMF, 25 chewers of gutkha with no OSMF, and 25 healthy controls participated on the qualitative

examination of dermatoglyphics in oral submucous fibrosis. The rate of loops in chewers of gutkha with OSMF and controls increased significantly, while the control group's whorl patterns also increased .The right index and right ring fingers uncovered rising whorl patterns among the digits .P values are 0.0328 and 0.0368 respectively. (Munishwar et al. 2015)

Breast Cancer

All gynecological indicators showed highly significant values ($p<0.0001$), with a greater prevalence of whorls in breast cancered people. arches were more common in high-risk individuals, and whorls and arches were more common in healthy persons. Thus, this opens the door to additional investigation into the predictive potential of gynecological parameters using qualitative dermatoglyphic indicators. (Ambali et al. 2024)

Smokeing Tobacco

In this most recent study (Mehta et al. 2024) a correlation between users of smokeless tobacco and palmar dermatoglyphics was found. Even when dermatoglyphics alone cannot detect those who misuse alcohol and/or cigar packs, the findings of this study may help to refine diagnostic criteria. This study found a significantly significant difference ($P = 0.020$ and $P = 0.010$) in the number of whorls and arches between male cases and male controls. The number of loops in male patients was statistically considerably higher (P 0.001) than in male controls.

Bronchial Asthma

Sharma et al , in their study bronchial asthma patients consistently showed more loop and whorl shapes on all fingers. In comparison to controls but fewer arch patterns. These results point to a possible connection between fingerprint patterns and bronchial asthma, supporting the use of dermatoglyphic analysis as a non-invasive method of assessing asthma risk. (Sharma et al. 2024)

In branchial asthma When comparing patients to the control group, a substantial rise in the arches mean values as well as noting the mean value of the ulnar loops. In both groups, the mean values of TFRC, AFRC, and whorls were comparable. (Singh et al. 2016)

Diabetes Mellitus

A study done by (Tadesse et al. 2022) examined the relationship between diabetes mellitus and dermatoglyphic patterns. When comparing diabetic patients in Ethiopia to healthy controls, dermatoglyphic patterns and diabetes mellitus revealed similar trends of changed fingertip patterns, with decreased arch patterns and increased loop and whorl patterns. (Tadesse et al. 2022)

Caries

The research by (Anitha et al. 2014) .uncovered a rising incidence of whorls in non-adults with ECC and ulnar loops in non-adults without cavities. low mean and low mean atd angle. The ECC group showed a total ridge count. (Anitha et al. 2014)

Comparing the tooth decay group to the non-decayed group, the former displayed a higher frequency of whorls, that were commoner in women, and a lower occurrence of loops. The whorl pattern and the microbial counts of Lactobacillus and Streptococcus mutans (S. mutans) were significantly correlated. (Shah et al. 2023)

(Wang et al. 2024) found that There were 883 people in the dental tooth-decayed group and 680 in the tooth non-decayed group, out of the 1563 participants in the eight included trials. The dental tooth decay group and the non-decayed group did not differ much in the distribution of arches, loops, and whorls. None of the other subgroups differed significantly, with the exception of a statistically significant dissemination of arches by research type ($p = 0.02$). On the other aspect, the distribution of loops was less common, the recurrent rate of whorls was higher among female participants with dental decay than in the sound group (Wang et al. 2024)

Digital Dermatoglyphics In Health

An experiment made upon Indian Muslim people, it was discovered that the patterns were distributed as follows: ulnar loop (max) > spiraling whorl> twinned loop > centralized pocket loop> concentrical whorl > tented arch > plain arch > radial loop > lateral pocket > coincidence (min). The results of the t-test revealed no statistically significant difference among the sexes ($p > 0.05$). (Kapoor and Badiye 2015)

2. HYPERTENSION PREDICTION

(Shirali et al. 2018) showed in their study at each level, whorls hade been commoner in instances than in controls, and the dissemination of dermatoglyphic shapes

was significant from a statistic point of view in events than in controls, according to a contrast of the dermatoglyphic shapes in the two groups in a number of different ways, including those two hands unruffled, the right as well as left hands distinctly, identical fingers on the right and left hands both, and identical fingers unconnectedly. (Shirali et al. 2018).

3. CONCLUSIONS

Dermatoglyphics recording has advanced in a number of ways recently. Skin patterns and outward body traits have been linked to dermatoglyphics, which can be utilized to build diagnostic models for phenotypic appearance diagnosis and personality identification. Dermatoglyphics' use as a genetic marker in a number of disorders does have a solid scientific foundation. Understanding the connection between dermatoglyphic variations and medical diseases can help make it a great non-invasive tool for diagnosing a number of systemic conditions.Examining the genetic causes of oral and craniofacial problems can be done easily, affordably, effectively, and noninvasively with dermatoglyphics.Therefore, dermatoglyphics is a great tool for screening the population for many medical and dental conditions as well as to personal identity.

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