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The Genetic Trace of Sight: Correlating Fingerprint Patterns with Myopic Tendencies

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Abstract

Dermatoglyphics, the scientific study of epidermal ridge patterns on fingers, palms, toes, and soles, serves as a valuable biometric tool due to the uniqueness and permanence of these patterns. In this study, we investigated the dermatoglyphic features of individuals to assess potential correlations between fingerprint ridge patterns and myopic conditions. As these patterns are established during early fetal development and remain unchanged throughout life, they may reflect intrauterine influences and genetic predispositions linked to refractive errors such as myopia. The research focused on the analysis of ridge counts, pattern types, and specific dermatoglyphic variables across study participants. Findings suggest that certain dermatoglyphic traits may act as non-invasive, early indicators of susceptibility to myopia, supporting their potential application in predictive diagnostics and genetic studies.

Keywords: *Dermatoglyphics, Finger print pattern, ridge pattern, myopic condition, palm print.*

Introduction

Dermatoglyphics is a branch of science that deals with the systematic study of the patterns of epidermal ridges present on the fingers, palms, toes, and soles of humans [1-2]. Coined by Dr. Harold Cummins, often referred to as the "Father of Dermatoglyphics," the term has its origin in the Greek words *derma* (skin) and *glyph* (carving). These patterns are genetically determined, unique to each individual, and remain unchanged throughout life, except in cases of severe injury involving the dermis. Due to these characteristics, dermatoglyphics has been widely used in forensic science, anthropology, and medical research [3]. The ridges begin to form during the 10th to 12th week of gestation and are fully developed by the end of the second trimester. As such, dermatoglyphic patterns can be viewed as a window into intrauterine life, reflecting genetic and environmental influences during early development. Numerous studies have established associations between specific dermatoglyphic traits and a variety of congenital and hereditary disorders, including Down syndrome, schizophrenia, diabetes mellitus, and cardiovascular diseases [4]. The stability and uniqueness of these patterns make dermatoglyphics a non-invasive, inexpensive, and effective tool for early diagnosis and risk assessment of certain medical conditions.

In recent years, researchers have begun exploring the potential role of dermatoglyphic markers in ocular diseases, particularly refractive errors such as myopia [5]. Myopia, or nearsightedness, is a common visual disorder characterized by the elongation of the eyeball, resulting in the focus of images in front of the retina rather than on it. It is estimated that nearly half of the global population may be affected by myopia by 2050, making it a significant public health concern. The condition often begins in childhood and progresses through adolescence, with both genetic and environmental factors contributing to its development, the growing prevalence of myopia, early detection and prediction remain a challenge, especially in resource-limited settings [6]. Traditionally, the diagnosis of myopia has relied on visual acuity testing, refractive assessments, and imaging techniques. However, these methods often detect the condition after the onset of symptoms. Therefore, there is a need to explore alternative, non-invasive screening tools that can help identify individuals at risk of developing myopia at an early stage. Given that both dermatoglyphic patterns and myopia have strong genetic influences and develop during the same prenatal period, it is hypothesized that a correlation may exist between specific fingerprint patterns and the likelihood of developing myopic conditions. Previous research has suggested associations between dermatoglyphic variables—such as total ridge count (TRC), pattern types (whorls, loops, arches), and angles formed by triradii (e.g., ATD angle)—and various physical and cognitive traits [7]. These parameters may also reflect underlying developmental anomalies associated with ocular growth.

The present study aims to investigate the dermatoglyphic characteristics in individuals with myopia, with an emphasis on identifying potential patterns or markers that could serve as predictive indicators.

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By analyzing specific variables such as TRC, pattern distribution, and inter-triradial angles (ATD, ABD, and CAD angles), we seek to establish a correlation between dermatoglyphic features and myopic tendencies [8]. A comparative analysis between individuals with diagnosed myopia and those without refractive errors was conducted to evaluate the statistical significance of any observed differences.

This approach is grounded in the concept of using dermatoglyphics as a biometric proxy for genetic expression during embryogenesis. Since both dermatoglyphic patterns and the anatomical structures of the eye are influenced by similar developmental processes, particularly during the first and second trimesters, it is plausible that specific deviations in fingerprint formation may correspond with atypical ocular growth patterns [9]. Identifying such correlations could pave the way for early, non-invasive screening tools to identify individuals at risk of myopia, enabling timely intervention and management, the integration of dermatoglyphic analysis into ophthalmic research represents a promising interdisciplinary approach that bridges genetics, embryology, and clinical diagnosis. By examining dermatoglyphic traits as potential bio-indicators for myopia, this study contributes to the growing body of knowledge aimed at developing novel, cost-effective, and accessible diagnostic strategies [10]. If successful, this line of inquiry could enhance predictive models for myopia and support public health initiatives aimed at mitigating the global burden of refractive errors.

The three basic dermatoglyphic landmarks found on the fingertip patterns are as follows

1. Triradius: It is formed by the confluence of three ridge systems that form angles of approximately 120° with one another.

2. Core: Core is in the approximate center of the pattern. The core may be of different shapes. In a loop pattern, the core is usually represented by a straight, rod-like ridge or a series of two or more such parallel ridges. In a whorl, the core can appear as a dot or a short ridge (either straight or bent) or it can be shaped as a circle or an ellipse in the center of the pattern.

3. Radiants: These are the ridges that emanate from the triradius and enclose the pattern area. These ridges constitute the "skeletal" framework of the pattern.

RIDGE COUNTS

These are made from triradii point to point of the core. After locating the triradii point and point of the core, as outer and inner termini of the count, the line is set in position to connect them. Triradial point and print of core are not included in the count [11]. As there are two counts in whorls, only the higher one is used. In single arches, the score is "zero."

The count on the ten fingers of each individual is then summed up to give a single value, the total ridge count [6-9].

INTERDIGITAL AREAS

Interdigital intervals, the clefts between digits, are numbered in sequence beginning with the interval between the thumb and index finger [12]. The palmer surface is divisible into dermatoglyphic areas or configurational fields, which are hypothenar, thenar and the four interdigital areas numbered I to IV. Each area is a topographic unit, and there is in some palms a discrete pattern and partial boundaries formed by triradii and their radiants for each area. Characteristically, there are four "digital triradii" located in proximal relation to the bases of digits II, III, IV, and V. In radioulnar sequence, they are named a, b, c, and d. Axial triradius (t) is located at or near theproximal margin of the palms, in the interval between thenar and hypothenar eminences. The configurational area lying between digital triradii "a" and "b" is interdigital II, that between triradii "b" and "c" is interdigital III, and the area between triradii "c" and "d" is interdigital IV . When a digital triradius fails or is much displaced the midpoint of the base of the corresponding digit affords a landmark separating the interdigital areas on either side [13]. The configuration may be a true pattern (whorl or loop), a vestige or an open field. Whenever there are two patterns in an area, the one on the radial side is written first [10-14].

GENETIC CONDITIONS

Dermatoglyphics approach is used as a tool to diagnose many genetic disorders because, ridge formation formed in the fetal stage of hands and soles remain unchanged till the individual's death. Secondly this approach is non-invasive and inexpensive. The first attempt of using dermatoglyphics as a tool to diagnose genetic abnormalities was done in 1950 to diagnose Mongolism. Later the same tool was used by different investigators to diagnose other diseases caused due to chromosomal aberrations, single gene disorder and other diseases with unknown etiology [14]. There are many ways to record the dermatoglyphics patterns by numerous authors. Collection of prints from adults and older children are simple but not the same from the newborns and fetuses. Dermatoglyphics is used as bio indicator to diagnose genetic abnormalities like Down's syndrome, 18q condition, which confirmed the presence of excess of whorls on their fingers compared to normal [15]. To investigate the differences between Monozygotic and dizygotic twins. In Turner's syndrome, Klinefelter's syndrome congenital clept lip. To diagnose breast cancer risk in early stages, to detect the risk occurrence in case of Down's syndrome child, by analyzing the palm prints of both the parents. Further the approach was also extended to diagnose blood pressure, congenital heart disease, Rheumatoid arthritis, bronchial asthma and insulin dependent diabetes [16]. Apart from diagnosis of disorders it can be used to identify individual's talent and to detect crime cases dealing with myopia, Myopia is also called as

nearsightedness or short sightedness and one of the common eye disorders worldwide. Here basically the light focuses in front of, instead of on the retina of on the retina. This may cause distant objects to be burry when close objects appear normal. Myopia is one of the risk factors for several eye disease like Cataract, Glaucoma, Retinal detachment and myopic retinopathy. A risk for myopia may be inherited from one's parents genetic linkage studies have identified 18 possible loci on 15 different chromosomes that are associated with myopia, but none of these loci is part of the individual gene that cause myopia. Instead of myopia being caused by a defect in a structural protein, defects in the control of these structural proteins might be the actual cause of myopia. The other factors responsible for development myopia include environment factors, genetic factors, vitamin d receptor polymorphism and behavioral pattern as a whole [17-19].

IMPORTANCE OF THE TOPIC

Dermatoglyphics studies is important in forensic sciences mainly for crime investigation i.e to find out the evidence left behind a suspect or victim to identify at the crime scene and what he or she touched. Here fingerprints play an important role as these remain unchanged even after death expected due to external changes and by analyzing these patterns, we are able to find out significant variations with respect to pathologies. Dermatoglyphics can produce significant gains in children learning and development [20]. Integrating dermatoglyphics findings with early childhood education assists many children in avoiding poor outcomes such as dropping out of school it specially strengthen's child's week fields which provides a suitable learning method that enables the child to learn effectively and develop in their interest of field, with respect to adults it is important to understand fully their strong and weak fields and to know the most suitable learning style and to position themselves in the most suitable field of work or study, and with respect to corporate people it is important to manage human resources and customer management more effectively and to reduce the operating cost and increase corporate value [21]. And it is very important to understand one's multiple intelligences, and it is unbiased towards cultural background, results are not affected by environment, health, emotional factors and reliable genetic information as fingerprints never change lifetime and it is simple convenient, no adverse effects.

NEED OF THE TOPIC

Dermatoglyphics are often used for identification that are used as evidences in linking a suspect to a particular crime scene, they are genetically determined and used for diagnosing various genetic diseases like congenital malformations, it inherits innate genetics from their parents. By analyzing dermatoglyphics, we can understand the amount of distribution of cells in the left and right brain of the cells, and useful in the prediction where the potential lies and through this studies it brings out importance in various fields, the modern study of the hand through decades of scientific research has come to be recognized as a powerful tool in the diagnosis of psychological, medical and genetic conditions and we are all unique and our fingerprints are major predictors of personal identity like (Adhar card). DMIT is a remarkable theory of multi- intelligence and the discoveries have made a firm basis for modern study and this study is very important to find out the inborn talents. Dmit is done in three easy steps by the combination of new computer technology and science using DMIT software. First step is fingerprint scan, second step is analyzing fingerprints, like for example atd angle has been used for selecting many athletes in china, Taiwan, Malaysia, Japan, Russia [22-23]. Less than 35^0 atd angle predicts the potential of a person as a born athlete, sharp observer. An angle of more than 46^0 and above considered being a slow learner. Third step is counseling and through these steps we can come to know about the ability of the person, his/her capacity towards their field of interest.

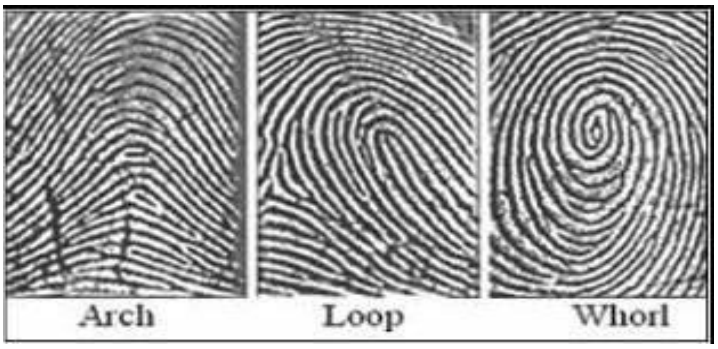

Figure 1: Fingerprint types

Review of Literature

A comprehensive review of literature was conducted using PubMed (NCBI) to understand current research trends related to myopia and to evaluate the potential use of dermatoglyphic patterns as a bio-indicator for this condition. Recent studies have highlighted that approximately 15% of the Middle Eastern population suffers from myopia, with the condition being identified as a significant contributing factor to reported accidents. A specific concern is night myopia greater than 0.75 diopters, which impairs vision in low-light conditions [24]. Researchers have concluded that genetic, environmental, and behavioral factors collectively contribute to the development of myopia [25-27].

Genetic studies have revealed several linkage regions associated with myopia, including:

- Chromosomes 2q, 4q, 7q, 12q, 15q, 17q, 18q, 22q, and Xq
- Notably, genes located on 7q, 15q, 22q, and 36 have been implicated in regulating ocular growth and myopia development.

In addition, polymorphisms in the Vitamin D receptor gene have shown a significant association with myopia, suggesting a possible role of vitamin D metabolism in eye development. These findings support the idea that abnormalities in genetic expression during fetal development—which can affect both ocular growth and dermal ridge formation—may provide early markers for conditions such as myopia [28]. Therefore, dermatoglyphic deviations might reflect such developmental anomalies. Further supporting this concept, animal model

studies, particularly those involving form deprivation techniques, have identified altered regulation of biological substances in the ocular wall layers. These findings are now guiding the prioritization of human candidate gene studies.

Epidemiological research has also emphasized the protective role of outdoor activity in reducing the incidence and severity of myopia, challenging earlier theories that focused solely on near-work activity as the main contributor. Despite various experimental interventions to prevent myopia progression, none have proven conclusively effective.

The identification of myopia susceptibility genes is expected to:

- Enhance understanding of the molecular and developmental mechanisms involved in eye growth
- Contribute to the discovery of new therapeutic pathways
- Potentially lead to preventive strategies for myopia

Given the connection between fetal development, genetic markers, and dermal ridge patterns, dermatoglyphic analysis emerges as a promising, non-invasive technique for early detection and risk assessment of myopia. Thus, the literature supports the relevance of dermatoglyphics as a supplementary method in the identification and study of myopic conditions [29].

Research Gap

Although numerous studies have been conducted to address the challenges posed by myopia, and various therapeutic and diagnostic techniques have been developed, many of these approaches remain inaccessible or unaffordable, especially in resource-limited settings. Despite ongoing advancements, there remains a need for simpler, cost-effective, and non-invasive diagnostic tools. In this context, dermatoglyphics has emerged as a promising approach due to its simplicity, affordability, and ease of application. However, while dermatoglyphics has shown potential in detecting genetic and congenital abnormalities, its application in identifying genetic biomarkers specifically associated with myopia remains underexplored [31]. This creates a research gap that warrants further investigation to validate dermatoglyphic patterns as a reliable biological indicator for myopia and related ocular conditions.

Scope of the Study

As previously noted, fingerprints have long served as a gold standard for personal identification in forensic science. In recent years, however, there has been a renewed interest in dermatoglyphics due to its potential to provide deeper insights beyond identification—extending into the realm of biomedical diagnostics, genetic profiling, and psychological assessments.

The scope of this study encompasses:

- Investigating the relationship between dermatoglyphic patterns and myopia, aiming to establish dermatoglyphics as a genetic biomarker.
- Exploring the utility of dermatoglyphics in identifying individual traits, such as race, ethnic background, biological age, and congenital conditions.
- Highlighting the multidisciplinary relevance of fingerprint analysis, including its integration with forensic science, nanotechnology, biochemistry, and medical research.

In forensic applications, latent fingerprint analysis has advanced significantly, enabling the visualization of previously undetectable prints. Beyond forensics, dermatoglyphic studies have gained traction in countries like the United States, Japan, and Taiwan, where they are now used to:

- Diagnose congenital and genetic disorders
- Assist in early educational assessments
- Improve human resource management and individual talent identification

This study seeks to contribute to this evolving field by evaluating the diagnostic relevance of dermatoglyphics in myopic conditions, thereby expanding its application in genetic, medical, and forensic sciences.Materials and Methods.

In the present study, a sample population of 25 individuals diagnosed with myopia was selected for dermatoglyphic analysis.

Inclusion and Exclusion Criteria

- **Inclusion**: Individuals clinically diagnosed with myopia.
- **Exclusion**: Individuals with deformed fingers or palms, infections, burns, or scars on their hands that could interfere with obtaining accurate prints.

Preparation and Procedure

1. Informed Consent: The purpose and procedure of the study were explained in detail to all participants. Written consent was obtained prior to data collection.

2. Hand Cleaning: Participants were asked to thoroughly wash their hands with soap. If excessive sweating was present, the palms were wiped clean using a cloth or alcohol swab to ensure clarity in print capture.

3. Relaxation: Participants were seated comfortably and encouraged to remain passive and relaxed during the procedure to allow for free and natural hand manipulation.

Fingerprint and Palm Print Collection

4. Digital Fingerprints

- A thin layer of kajal (carbon-based pigment) was applied to the fingertips.
- Each finger was rolled from the radial to ulnar side onto pre-labeled squares on white paper, with one square allocated per finger (total of ten).

5. Palmar Impressions

- Kajal was applied uniformly across the palm.

- The palm was pressed gently and evenly on to A4-sized sheets starting from the wrist side to ensure complete imprint of:

- The central hollow
- Flexion creases at the wrist
- Ulnar margin
- Finger-to-palm junction creases

Classification and Analysis

6. Pattern Identification

- Clear digital prints were classified into three basic fingerprint patterns: arches, loops, and whorls.
- Each fingerprint was independently examined and scored using a hand lens to enhance visibility and ensure precision in pattern identification and ridge counting.

7. Triradius Positioning

The palm was evaluated for digital triradii, labelled as follows:

- **a'**: below the index finger
- **b'**: below the middle finger
- **c'**: below the ring finger
- **d'**: below the little finger

8. Data Recording

- All dermatoglyphic data were systematically recorded and tabulated.
- The recorded values were analyzed using appropriate statistical methods to interpret any significant correlations between dermatoglyphic patterns and myopic conditions.

Limitations of the Study

The advantages of dermatoglyphic analysis as a non-invasive and cost-effective diagnostic tool, there are several limitations that can impact the accuracy and reliability of the results. One major concern is the quality of the prints, which depends heavily on the appropriate application of the ink or pigment. Applying too much or too little can result in poor-quality prints that are difficult to interpret, the atd angle—an important dermatoglyphic measurement—can be affected by the degree of finger spreading and the amount of pressure exerted while recording the palm prints. Inconsistent positioning or pressure can lead to inaccurate or distorted readings [31-32]. Furthermore, individuals with hand deformities, malformations, injuries, or skin conditions may present challenges in obtaining clear and usable prints, thereby limiting the effectiveness of dermatoglyphics in such cases. These factors highlight the need for standardized procedures and careful handling during the recording process to ensure reliable results.

Results and Discussion

In the present study, a sample population of 25 individuals diagnosed with myopia was randomly selected for dermatoglyphic analysis.

Prior to data collection, the purpose and procedure of the study were clearly explained to all participants to ensure informed consent and cooperation. Fingerprints and palm prints were recorded using the technique described in the methodology section, ensuring consistency and clarity of impressions [33-34]. Each individual's digital and palmar prints were collected, categorized, and analyzed for dermatoglyphic patterns, including the presence of arches, loops, and whorls. Additionally, important parameters such as the triradii positions, atd angles, and ridge counts were observed and documented. As an illustration of the process, a representative sample from one of the 25 subjects is provided below [25]. This sample demonstrates the standard technique used for print acquisition, classification, and analysis.

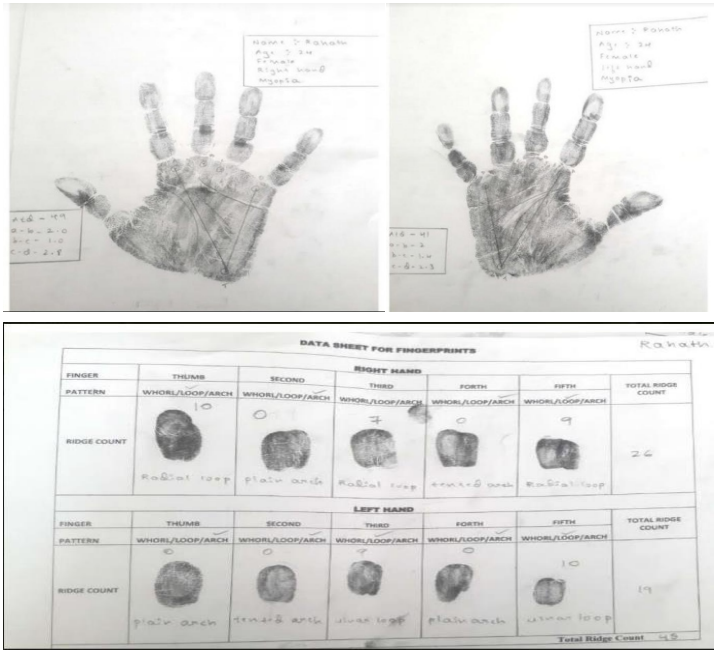

Figure 2: Handprint of one sample (individual) out of 25 samples

Analyses of dermatoglyphics on palms

- a-b ridge count R – number of ridges between the triradii a and triradius b of the right hand
- a-b ridge count L – number of ridges between triradii a and triradius a and triradius b of the left hand.
- b-c ridge count R- number of ridges between tiradii b and triradius c of the right hand.
- b-c ridge count L- number of ridges between triradii b and triradius c of the left hand.
- c-d ridge count R- number of ridges between triradii c and triradius c of the right hand.
- c-d ridge count L – number of ridges between triradii c and triradius c of the left hand.
- ATD-R the angle size between triradiii a, t and d of the right hand measured in degrees.
- ATD-L the angle size between triradii a, t and d of the left hand measured in degrees.

After counting all the ridge counts, atd angles and counting the tfrc, patterns and it can be calculated with t test and in tabular column.

Table 1. Statistical Analysis of T-Test

	f	fx	fd^2	$\bar{x}$	s^2	SD	SX^-
TFRC	2 5	3504.5	98726.44	140. 18	4113 .60	64.13	12.826
atd (R)	25	1175	740	47	30.83	5.55	1.11
atd (L)	25	1209	971.76	48.36	40.49	6.36	1.272
a-b (R)	25	52.4	4.94	2.0	0.205833	0.45368	0.1347
b-c (R)	25	41.5	4.82	1.66	0.20	0.44	0.088
c-d (R)	25	54.1	6.44	2.164	0.26833	0.5180	0.10
a-b (L)	25	54.8	1.64	2.1	0.160	0.4	0.08
b-c (L)	25	41.3	5.45	1.6	0.22	0.46	0.09
c-d (L)	25	56.2	6.44	2.2	0.26	0.50	0.1
Whorl	15	107	19.7335	7.13	1.409	1.187	0.306
Loop	10	74	38958	74	4328.66	65.79	20.819

Degree of freedom	Upper limit	Lower limit	Conclusion
2.064	166.65	113.71	$\mu 1$=166.65>$\bar{x}$=140.18> μ_2=113.71
2.064	49.29104	44.70896	$\mu 1$=49.29104> $\bar{x}$=47> $\mu 2$=44.7089
2.064	50.98	45.76	μ_1=50.98> $\bar{x}$=48.36> μ_2=45.76
2.064	2.2780208	1.7219792	μ_1=2.2780208> $\bar{x}$=2.0> μ_2=1.7219792
2.064	1.84	1.48	μ_1=1.84> $\bar{x}$=1.66> μ_2 =1.48
2.064	2.3064	1.8936	μ_1=2.3064> $\bar{x}$=2.164> μ_2 =1.8936
2.064	2.26	1.94	μ_1=2.26> $\bar{x}$=2.1>μ_2 =1.94
2.064	1.78	1.42	μ_1=1.78> $\bar{x}$=1.6>μ_2 =1.42
2.064	2.4	2	μ_1=2.4> $\bar{x}$=2.2>μ_2 =2
2.145	7.78637	5.34363	μ_1=7.78637>$\bar{x}$=7.13> μ_2=5.34363
2.262	121.092579	26.907421	μ_1=121.092579>$\bar{x}$=74>μ_2 =26.907421

Discussion

From the tabular column we come to a conclusion that the atd angle for a normal person range from 30° to 60°, the atd angle for this condition will be less than 60° and whorl and loop seems to be the common pattern found in this study. And another biomarker found in this study is c' region shits towards b' or d'and when the c shifts ridge count will be lesser and in this study. Given below in the table1 differentiates c' variations happens in one hand, some happens in both hands and in some c' variations doesn't happens only has been explained in % and represented in graphical representation and in table2 it specifically explains the c' variations (shift) towards b' or d' like c' shifts towards b' in one hand , c'shifts towards b' in both hands, c' shifts towards d' in one hand , c' shifts towards d' in both hands and likewise table 1 it is also explained and represented through graphical method [36-40].

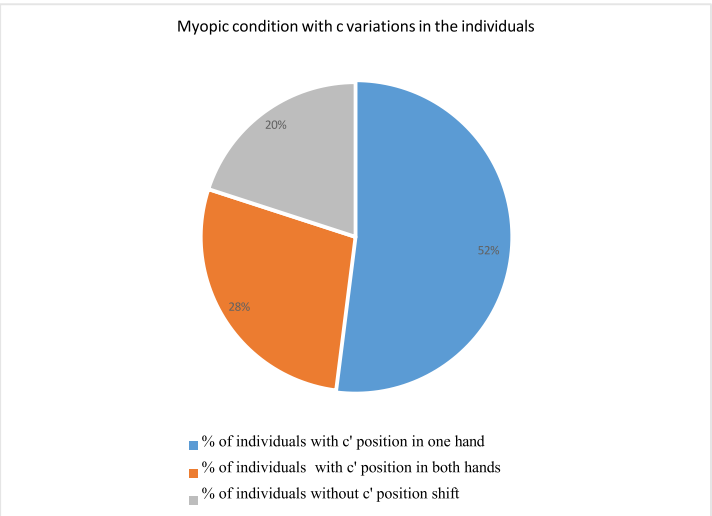

Figure 3: Graphical representation of c'variations in the individuals with myopia

Table 2: No of individuals with 'c' variations in the individuals with myopia

No. of individuals with variations in 'C' position in both hands	7
% of individuals with variations in 'C' position in both hands	28%
No. of individuals with variations in 'C' position in one hand	13
% of individuals with variations in 'C' position in one hand	52%
No. of individuals without variations in 'C' position	5
% of individuals without variations in 'C' position	20%

Table 3: 'c' shift towards 'b' or 'd' regions in one hand or both the hands in myopic patients

No. of individuals with 'c' position shift towards 'b' in both the hands	2
% of individuals with 'c' position shift towards 'b' in both the hands	8%
No. of individuals with 'c' position shift towards 'd' in both the hands	1
% of individuals with 'c' position shift towards 'd' in both the hands	4%
No. of individuals with 'c' position shift towards 'b' in one hand	13
% of individuals with 'c' position shift towards 'b'in one hand	52%
No. of individuals with 'c' position shift towards 'b' in one hand	9
% of individuals with 'c' position shift towards 'b' in one hand	36%

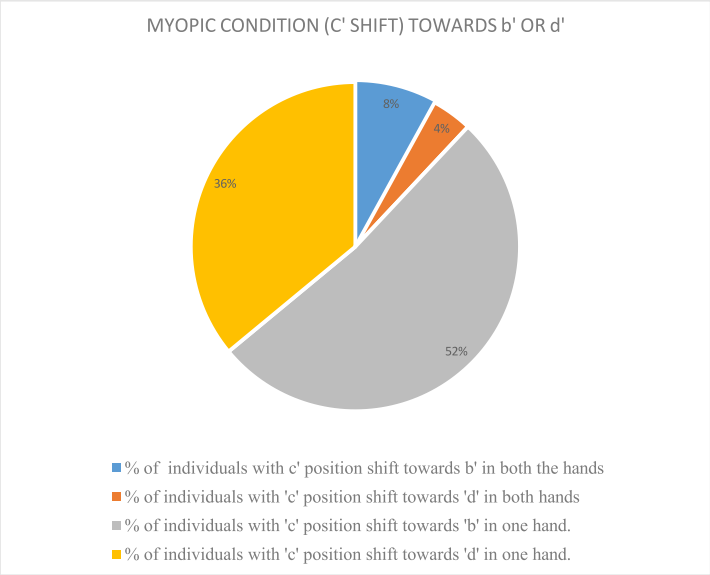

Figure 4: Graphical representation of c shift towards b or d regions in one or both hands in myopic patients

Summary

This study highlights the significance of dermatoglyphics, a scientific discipline that deals with the analysis of skin ridge patterns found on the fingers, palms, toes, and soles. These patterns are genetically determined, form early during fetal development, and remain unchanged throughout an individual's life unless affected by significant dermal injury. Due to their uniqueness and permanence, fingerprints serve as a reliable tool for both personal identification and the diagnosis of various hereditary and genetic disorders. Dermatoglyphics holds diagnostic value because any abnormalities during fetal development may influence ridge formation, thereby serving as indicators of underlying genetic conditions. This non-invasive, cost-effective technique has been widely used to detect disorders such as Down's syndrome, Turner's syndrome, Klinefelter's syndrome, cleft lip, and even predispositions to diseases like breast cancer, diabetes, rheumatoid arthritis, and congenital heart conditions. Beyond medicine, dermatoglyphics is also applied in educational, psychological, and forensic settings, including talent identification and criminal investigations. In the current study, dermatoglyphics was explored as a bioindicator for myopia, a common refractive error where distant objects appear blurry due to the eye's inability to properly focus light on the retina. Myopia is influenced by both genetic and environmental factors. Genetic linkage studies have identified multiple loci across 15 different chromosomes associated with the condition, though no single causative gene has been established. Emerging evidence also suggests that regulatory protein defects, rather than structural gene mutations, may be involved in myopia development. Using dermatoglyphic analysis, this study examined 25 myopic patients to investigate the presence of distinct dermatoglyphic patterns that could serve as genetic biomarkers for early identification of the condition. Fingerprint and palm prints were collected and analyzed, with particular attention given to parameters such as ridge counts, triradii positions, and atd angles. Statistical methods like the t-test were applied to detect significant variations. The findings revealed a commonality in patterns, especially in the 'c' region of the palm, suggesting a potential correlation between dermatoglyphic features and myopic conditions. This research supports the utility of dermatoglyphics as a supportive diagnostic tool in identifying individuals at risk for myopia, offering possibilities for early detection, intervention, and broader applications in genetic and medical research.

Conclusion

Dermatoglyphics serves as an important, non-invasive tool for the early diagnosis of genetic conditions and has proven effective in identifying individuals with various hereditary traits and disorders. In this study, dermatoglyphic analysis was utilized to investigate myopia, a genetically influenced ocular condition. The findings suggest a consistent pattern among the myopic individuals, particularly with regard to the atd angle, which was observed to be less than 60°, and variations in the 'c' region of the palm, whorl and loop fingerprint patterns emerged as the most prevalent among the myopic participants. Notably, the 'c' triradius region showed a significant shift—either towards the 'b' or 'd' region—indicating a possible association between this variation and the presence of myopia. These deviations were observed either in both hands or at least in one hand across the sample group. Based on these dermatoglyphic findings, it can be inferred that variations in the 'c' region, alongside other specific ridge pattern features, may serve as reliable early indicators for the onset of myopia. Recognizing these biomarkers could aid in early diagnosis, timely intervention, and potentially contribute to the prevention or management of myopia through lifestyle or clinical approaches.

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