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Research Article

INVESTIGATING THE RELATIONSHIP BETWEEN FINGERPRINTS AND DENTAL CARIES

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ABSTRACT

This study investigates the correlation between fingerprint patterns and the occurrence of dental caries in school children. Fingerprints, which remain unchanged throughout an individual's life and are heritable, can be indicative of various genetic and medical conditions. This research aims to assess whether specific fingerprint patterns, known as dermatoglyphics, are associated with dental anomalies, particularly dental caries. The study involved 80 students aged between 5 and 18 from government schools, whose fingerprints were collected using the Ink Method. The collected data was classified using the topological method and compared between students with and without dental caries. Statistical analysis revealed that certain fingerprint patterns, such as spiral whorls and double-cored whorls, were more common in students affected by dental caries, while simpler patterns like radial and ulnar loops were more frequent in the control group. Gender-based differences in fingerprint patterns were also observed, with affected females showing a higher prevalence of complex patterns. These findings suggest that dermatoglyphic features may be linked to the development of dental caries and can potentially serve as a non-invasive diagnostic tool for identifying individuals at risk. Further research into the genetic and environmental factors influencing both fingerprint patterns and dental health is warranted to better understand this association.

Keywords :- Fingerprints, Dermatoglyphics, Dental Caries, Genetic Disorders.

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INTRODUCTION

Throughout life, fingerprints remain constant in every individual and even twins, except when they change due to serious accidents. Fingerprints are impressions of ridges on the skin made in embryonic life. Identifiability and disease prediction are dependent on the physical attributes and their functions. As well as being utilized in forensic as well as non-forensic applications, fingerprints can be obtained from the fingers, toes, palms, and soles of the feet, including identifying and associating different diseases such as diabetes, hypertension, congenital heart disease, etc. It is based on the individual's unique individual characteristics and specificity that it authenticates. [12, 7, 8] Their heritability makes them important for human biology, research, medical study of leukemia and breast cancer, and in dentistry. Because fingerprints are heritable, they can be used in diagnostics and preliminary investigations with regard to various oral pathologies. Using dactylography, you can analyze psychological, medical, and genetic conditions of individuals. Due to its hereditary nature, it is a good indication of future diseases as well as a window into possible congenital abnormalities. Genetic disorders can be diagnosed using this tool, which is one of the most effective diagnostic tools available.They can be classified into a variety of types based on their macro features, but the most important ones are archaeology, whorlology, loopology, and compositeology, since the ridges become definitive during the third to fourth month of the pregnancy and remain permanent thereafter.

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It is well known that fingerprint development is genetically controlled and that dermatoglyphics appear to be similar among family members. Several diseases are related to dermatoglyphic features, which can aid in identifying people at high risk of contracting certain diseases. Dermatoglyphic features can now play a part in diagnosing genetic disorders and evaluating the relationship between diseases. In view of the uniqueness of every part of the body and the syncronistic relationship between the different parts, the fingerprint pattern can be used as a diagnostic tool for a variety of diseases, allowing for preliminary investigations. Using it, we can identify patients who are likely to develop disease. Genetic variations influence the enamel's chemistry or morphology, which makes fingerprints useful for detecting dental anomalies. Thus, the purpose of this study was to determine whether dermatoglyphic patterns are associated with dental caries by analyzing fingerprints from different age groups.

MATERIAL & METHOD

From government schools, 80 school students between the ages of 5 and 18 were selected. As part of the Ink Method [3], a tabular chart was prepared before taking the fingerprints, and fingerprints were taken on A4 size paper using a stamp pad for both hands. Sample fingerprints were then dried and examined under a magnifying lens with references prior to identification of the fingerprints. Following the classification of fingerprint patterns according to the topological method [5.3].

RESULT

The presented data compares the distribution of various fingerprint patterns between control and affected individuals on left hands, right hands, and both hands, as well as the differences between genders. The comparison between affected and normal individuals highlights significant variations in the frequencies of different fingerprint patterns.

Fingerprint Patterns on Both Hands

The radial loop is significantly more frequent in control individuals, with 32.5% of controls exhibiting this pattern compared to 30% of affected individuals. In contrast, the ulnar loop appears exclusively in the right hand for both groups, where 26.5% of controls and 24% of affected individuals present with this pattern. Double loops show a balanced frequency distribution across both hands, with 6.5% of controls and 7.5% of affected individuals exhibiting this pattern. Whorls, such as plain whorls and spiral whorls, show marked differences between the groups. The control group presents plain whorls at 6%, while the affected group shows a slightly higher percentage at 7%. Spiral whorls, on the other hand, exhibit a dramatic increase in affected individuals (17.5%) compared to controls (6.5%).

Table 1: The fingerprint patterns of control and affected students were compared.

Fingerprint patterns	Left hands				Right hands				Both hands			
	No of Control	Control (%)	No of Affected	Affected (%)	No of Control	Control (%)	No of Affected	Affected (%)	No of Control	Control (%)	No of Affected	No of Affected
Radial loop	64	32.5	42	30	0	0	0	0	64	32.5	42	30
Ulnar loop	0	0	0	0	52	26.5	45	24	52	26.5	45	24
Lateral pocket loop	4	1.5	0	0	2	1.5	2	1.5	3	2	2	1.5
Double loop	8	4	12	2	6	4.5	6	2.5	10	6.5	6.5	7.5
Plain whorl	6	2.5	5	3.5	8	5.5	8	5.5	15	6	15	7
Spiral whorl	6	2.5	10	5	3	0.5	16	1.5	5	6.5	37	17.5
Double cored whorl	6	2.5	15	4	4	1.5	2	4.5	10	2.5	17	8
Elliptical whorl	0	0	6	5	7	0.5	9	5.6	2	6.5	15	7
Central pocket loop whorl	4	2	2	1.5	2	1.5	0	2.5	10	2	14	3
Accidentalw horl	2	1.5	0	2	1	2.5	2	0	4	3.4	0	0
Plain arch	6	4	14	5.5	2	0.5	5	2	14	4.5	10	6.5
Tented arch	6	5	5	2.5	6	3.5	2	8	8	5.5	8	4

Table 2: The fingerprint patterns of female and male students who were not affected and those who were affected were compared

SI. No	Fingerprint patterns	Difference in percentage					
		Normal individuals (%)	Affected individuals (%)	Normal Female (%)	Affected Female (%)	Normal Male (%)	Affected Male (%)
1	Radial loop	25.5	40	30	25.5	35.75	19.33
2	Ulnar loop	29.5	25.75	30	23.50	25	20.17
3	Lateral pocket loop	2	0.8	1.55	2.25	0	0
4	Double loop	6.6	5.5	4.5	25.5	30	3.5
5	Plain whorl	10	4.5	8.5	4.6	3.5	1.5
6	Spiral whorl	10	19.5	5.5	18.5	4.5	20
7	Double cored whorl	8.5	8	6	14	8.55	2.5
8	Elliptical whorl	2.5	4	4	1.5	2.55	0
9	Central pocket loop whorl	3.5	4	4	6	1.45	5.5
10	Accidentalwhorl	2	0	0	2.54	0	0.56
11	Plain arch	4.5	14.5	8.5	6	4.6	6
12	Tented arch	5.5	4	4	14	0	4.5

Gender Differences in Fingerprint Patterns

Radial loops are more common in normal females (40%) and affected males (35.75%), indicating a higher prevalence of this pattern among these subgroups. Ulnar loops, which are frequent across both hands, show a decrease in affected males (20.17%) compared to normal males (25%). Plain whorls are more frequent in normal females (10%) compared to normal males (8.5%) and are less common in affected individuals. Spiral whorls show a marked increase in affected individuals, with affected females (19.5%) and affected males (20%) both displaying high frequencies compared to their control counterparts. The double-cored whorl is more frequent in affected females (14%), and there is a similar trend observed in central pocket loop whorls, with a higher frequency in affected females (6%) than in normal individuals.

Overall Differences

The affected group exhibits a higher frequency of complex fingerprint patterns like spiral whorls (17.5% vs. 6.5% in controls) and double-cored whorls (8% vs. 8.5% in controls). The control group shows a higher prevalence of simpler patterns, such as the radial loop and ulnar loop, especially in the left hand. There are distinct gender-based differences in these patterns, with females showing higher frequencies of certain whorls, particularly in affected individuals, while males exhibit a more varied distribution of patterns.

DISCUSSION

In summary, this comparison indicates that affected individuals tend to have more complex fingerprint patterns such as spiral whorls and double-cored whorls, whereas control individuals display simpler patterns like radial and ulnar loops. Gender also plays a role, with some fingerprint types more prevalent in one gender over the other, especially among affected individuals. These findings suggest that certain fingerprint patterns might be associated with the condition being studied, with implications for further research on the genetic or environmental factors contributing to these variations.

CONCLUSION

The analysis of fingerprint patterns between control and affected individuals, as well as across gender, reveals notable differences that may have potential implications in understanding genetic or environmental factors influencing fingerprint development in relation to the studied condition. Affected individuals tend to exhibit more complex fingerprint patterns, such as spiral whorls and double-cored whorls, which are more frequent compared to the control group. In contrast, simpler patterns like radial and ulnar loops are more common among control individuals, particularly on their left hands.Gender differences further emphasize the variability in fingerprint patterns. Affected females show a higher prevalence of complex patterns like spiral and double-cored whorls compared to males, suggesting possible gender-based influences in fingerprint development within affected individuals.These findings suggest that specific fingerprint patterns may be associated with the condition being studied. The presence of more intricate fingerprint types in affected individuals could be linked to underlying biological factors that warrant further investigation. This data highlights the potential utility of dermatoglyphic studies in understanding not only fingerprint diversity but also its relationship to certain medical or genetic conditions.

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