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ANALYSIS OF DERMATOGLYPHIC PATTERNS IN POPULATION WITH ORAL CAVITY

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ABSTRACT:

Dermatoglyphics deals with the study of the fine patterned dermal ridges on surfaces of sole of foot and palms..Dermatoglyphic patterns are assumed to be genetically controlled although the exact mechanism of inheritance is still unknown. The aim of the current study is to analyze the dermatoglyphic pattern in the population with oral cavity. This is a feasibility study conducted with a sample size of 20, in which 10 participants with dental caries and 10 normal participants. The samples were collected from Private Dental College in chennai. Their finger ridge patterns were collected using the digital camera and are used as outcome variables. The collected data was analyzed statistically using the SPSS tool. Majority of the participants observed to have 35% of ulnar loop patterns in the normal group compared to 40% of participants in the study group. The arch pattern is less (5%) prevalent in the study group when compared to the normal group (20%), however statistically there is no significant difference between the two groups with p value 0.52. From the obtained results it can be suggested that even though the two groups had no significant difference statistically, on observation we were able to find marked variation in the finger ridge patterns.

INTRODUCTION

The palms of the hands and the soles of the feet are covered with distinct classes of ridge patterns. The most conspicuous are the creases or folds of skin that interested the people in palmistry. Dermatoglyphics is the science and art of surface markings of thick skin, especially hands and feet. It is the epidermal ridge patterns of palms, digits, and soles. Toward the end of the 19th century, Galton put forth a rule called "proof of no change," which states that a person's finger ridge pattern remains unchanged throughout the lifetime. [1]Dermatoglyphics has drawn attention in the field of dentistry. It is known that finger and palm prints are formed during the 6th-7th week of the embryonic period and are completed after 10-20 weeks of gestation. [2]The finger ridge pattern can be categorised into three groups namely arches, loops, whorls. Taking an instance of dental caries, it is found that individuals with patterns such as plain loop, double loop, arch, whorl, tented arch, and central pocket loop have a high susceptibility to dental caries. Furthermore, since dermatoglyphics are genetically controlled characteristics, any deviation from the normal features indicates a genetic abnormality. [3]

Dental caries is also represented as tooth decay or cavities. It is one of the most common and widespread persistent diseases today. In the previous studies as stated by the authors, the population with dental caries had a decreased loop frequency. [4]. According to few previous studies it was also suggested that dermal ridges can be used as an effective biomarker of genomic instability in breast cancer. Females with breast cancer and those categorised as high risk females presented similar polymorphism status, variations in these genes increase the risk of occurrence of breast cancer. [5–8]The bacteria on our teeth breaks them down to produce acids that have the ability to damage the hard tissue in our tooth. Caries and the control group had differences in the triradii on fingers. Hence, the studies from recent researches suggest that dermatoglyphic could be used as an appropriate method for early prediction for dental impairment. Dermatoglyphics possess qualities of an adjunctive diagnostic tool in the identification of various orofacial dental disorders. The advantages of dermatoglyphic patterns as a diagnostic tool are the cost effective and faster interpretation of the findings. However, its usage in the field of dentistry needs to be explored further [9]. Previously our team had conducted numerous original studies [10–16] and surveys [17–24] over the past 5 years. Now we are focussing on applying this knowledge to write the review on new advancements in this field. The aim of this study is to explore the significance of dermatoglyphic patterns in the population with dental caries.

MATERIALS AND METHODS

The study was conducted in a private dental college and hospital in chennai. This is a feasibility study conducted with a sample size of N=20, in which 10 with dental caries and 10 normal population. The study was approved by the institutional review board. The study population was selected and grouped based on the opinion from the certified dentists and their finger ridge patterns were collected using the digital camera. The participants were explained in detail about the study and their willingness is obtained through their informed consent. The prevalence of arch pattern, whorl pattern, radial and ulnar loop pattern was used as an outcome measure. The finger ridge pattern was

collected and analysed using a computer. The collected data was analysed statistically for its significance between normal population and the study population using the SPSS tool.

RESULT AND DISCUSSION

The finger ridge pattern of the participants of the normal group was observed to have 20% of arch pattern , 35% ulnar loop pattern , 25% of radial loop pattern , and 20% whorl pattern . Ulnar loop is more prevalent in the normal group followed by the radial loop, the whorl and arch pattern is observed in equal proportion.(figure-1) The finger ridge pattern of the participants with oral cavity was observed to have 5% of arch pattern, 40% of ulnar loop pattern , 35% of radial pattern , and 20% of whorl pattern . The ulnar loop is more prevalent in the study group (40%) followed by radial loop, whorl and less proportion of arch pattern.(figure -2) Majority of the participants observed to have 35% of ulnar loop patterns in the normal group compared to 40% of participants in the study group. Chi square value was analyzed to be 2.200, the p value was 0.532 ($p > 0.05$), hence statistically not significant. It can be inferred that the arch pattern is less prevalent in the study group when compared to the normal group, however statistically there is no significant difference between the two groups.(figure - 3)

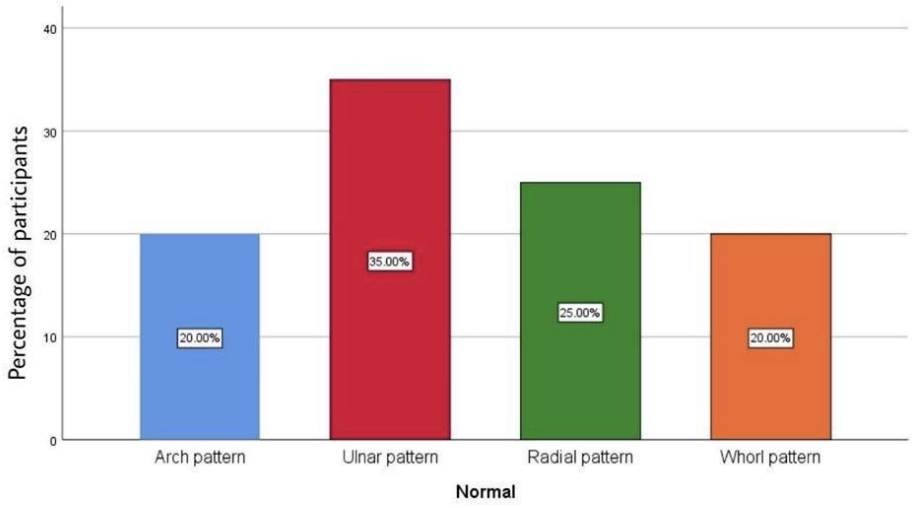

Figure 1: Bar graph representing the finger ridge pattern of the participants of the normal group.
X axis represents the finger ridge patterns, Y axis represents the percentage of participants. Blue colour denotes arch pattern (20%), red colour denotes ulnar loop pattern (35%), green colour denotes radial loop pattern (25%), and orange denotes whorl pattern (20%) . Ulnar loop is more prevalent in the normal group followed by the radial loop, the whorl and arch pattern is observed in equal proportion.

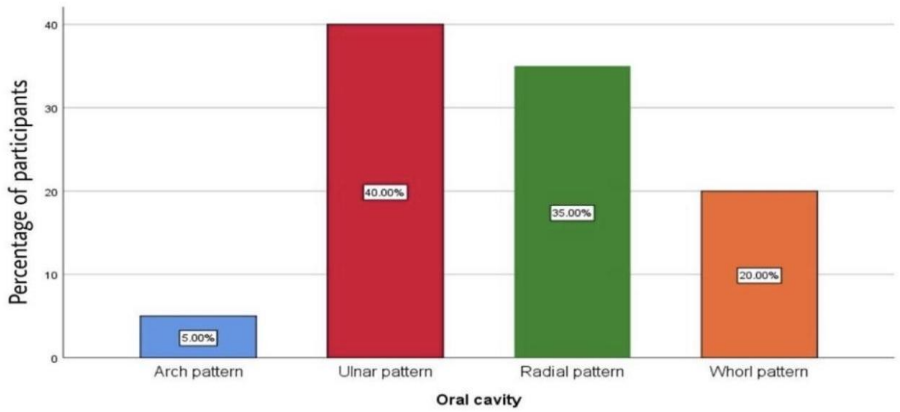

Figure 2: Bar graph represents the finger ridge pattern of the participants with oral cavity. X axis represents the finger ridge patterns and Y axis denotes the percentage of participants. Blue colour denotes arch pattern (5%), red colour denotes ulnar loop pattern (40%), green colour denotes radial pattern (35%), and orange denotes whorl pattern (20%). The ulnar loop is more prevalent in the study group (40%) followed by radial loop, whorl and less proportion of arch pattern.

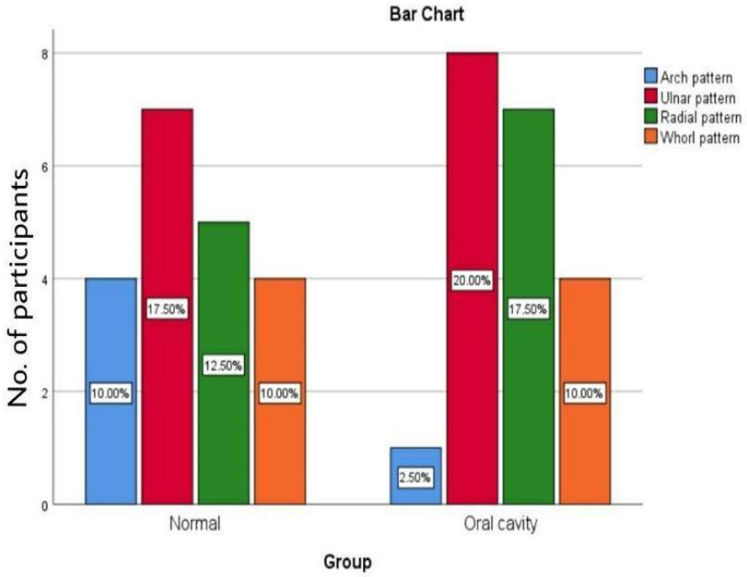

Figure 3: Bar graph representing the comparison of distribution of the ridge patterns among the normal and study population. X axis represents the groups and Y axis represents the number of participants. Blue colour denotes arch

pattern, red colour denotes ulnar pattern, green colour denotes radial pattern, and orange denotes whorl pattern. Chi square value was analyzed to be 2.200, the p value was 0.532 hence statistically not significant. It can be inferred that the arch pattern is less prevalent in the study group when compared to the normal group, however statistically there is no significant difference between the two groups.

The findings of the present study suggests finger ridge pattern among study group and normal group provided the result, the arch pattern in normal is 20% which is predominately higher than the malocclusion population. The loop patterns malocclusion (ulnar loop) is 40% and (radial loop) is 35% which is higher than the normal population. The whorl pattern is 20 % for both the normal and malocclusion population. Though statistically there is no significant difference, there is observable variation in pattern frequency between two groups.

As per a recent study done by S.Tikare, it has been found that there is no statistical analysis that seems to be positive for the association of finger ridge with malocclusion whereas from our study it is detected to be significant (P>0.05). Similarly, a recent study was done among the people with different classes of malocclusion and their finger ridge pattern was gathered and the palatial mean surface was detected and they reported that there were very few correlations between the dermatoglyphic pattern with malocclusion. [25] In 2009 A Sharma, stated that the aim of his study is to determine if there is any significant correlation between dental caries and salivary bacteria. He concluded that the study group had a decrease in the frequency of loops and the control group had an increase in loop frequency on all Palmer digits. [4] In 2018 a vivo study written by Kamalyit Kaur, stated that dental caries are the predominant cause of tooth loss in children and young adults. Dermatoglyphics is a genetic factor that contributes to dental caries. The aim of his study was to explore the unique relationship between genetic component and dental component and to identify children at particular risk of dental decay. In comparison with the previous study, the patterns were recorded using a digital scanner.. In this study, the subject group had a decreased frequency of loops whereas the control group had an increased frequency of loop pattern on Palmer digits. [26]

In 2011 Padma.K.Bhat ,stated that dermatoglyphics could be an appropriate method for an early predictor for dental and hearing impairment in children to initiate preventive oral measures at an early age. In comparison with the previous article, the overall population involved deaf and mute children. The test revealed a statistical association between whorl and loop patterns in caries and caries-free groups. He concluded, stating that caries experience was higher amongst the deaf and mute children. (P<0.001)

In the article written by C.Anitha, SapnaKode, it was stated that genetics plays an important role in the determination of Palmar dermatoglyphic patterns. In comparison with the previous article this study was undertaken to explore the possibilities of dermatoglyphics as a non-invasive and early

predictor of dental caries in children, so as to initiate preventive oral health measures at an early age. The study population consisted of 200 children between 4.5 years. The result from this study was that there was an increased frequency of ulnar loops in caries-free children and whorls in children with early childhood caries(ECC) was observed, indicating the dermatoglyphic patterns can be used as a predictive tool for children with ECC. [27]

Based on the previous study, it was stated that there is an increased frequency of whorl pattern in individuals susceptible to dental caries, but in comparison with the present study, the whorl pattern for both normal and malocclusion group remains the same. [28] Similarly, the study conducted by Bhat, also showed the increases in whorl frequency. [3] One more significant finding was reported by Priya, which was a higher frequency of arches and radial loops in subjects susceptible to dental caries.[29] Malocclusion too has been extensively studied to predict any specific dermatoglyphic pattern associated with it. A study was conducted usingdermatoglyphics to predict and compare Class I, Class II, division 1, division 2, and Class III malocclusions. A total of 96 subjects were divided into three malocclusion groups, Class I (control group), Class II, division 1, division 2, and Class III (experimental group) between the ages of 12–14 years. The dermatoglyphic findings revealed that the craniofacial Class II, division 1, division 2 pattern was associated with increased frequency of arches and ulnar loops and decreased frequency of whorls, whereas, in Class III, there was an increased frequency of arches and radial loops with decreased frequency of ulnar loops. [30] A study was carried out to systematically review and assess the correlation between dermatoglyphics and orofacial disease in the human population. The study concluded by stating that Dermatoglyphics has moved from obscurity to acceptability as a diagnostic tool. The research finding suggested a weak positive correlation between dental caries, malocclusion, and dermatoglyphics.[1].

CONCLUSION

From the obtained results it can be suggested that even though the two groups had no significant difference statistically, on observation we were able to find marked variation in the finger ridge patterns. The obtained results cannot be generalised as the findings were imprecise due to limited sample size. Future studies should be conducted with large sample size to identify the accurate frequency of occurrence of finger ridge pattern in the oral cavity population. Extensive study and research in this field are required to determine its validity. In the future, it may serve as an important tool that can predict the occurrence of oral cavities.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

1. Nagar A, Chaurasia A, Katheriya G. Dermatoglyphics in Dentistry. 2016.
2. Kumar D, Somani R, Jaidka S, et al. Dermatoglyphics as a Noninvasive Tool for Predicting Dental Caries in Cerebral Palsy and Healthy Children: An In Vivo Study. International Journal of Clinical Pediatric Dentistry 2019; 12: 237–242.
3. Reddy KKK, Kumar K, Subramaniyan V, et al. Dermatoglyphics: A new diagnostic tool in detection of dental caries in children with special health-care needs. International Journal of Pedodontic Rehabilitation 2018; 3: 18.
4. Sharma A, Somani R. Dermatoglyphic interpretation of dental caries and its correlation to salivary bacteria interactions: an in vivo study. J Indian SocPedodPrev Dent 2009; 27: 17–21.
5. Prathap L, Suganthirababu P, Ganesan D. Fluctuating Asymmetry of Dermatoglyphics and DNA Polymorphism in Breast Cancer Population. Indian Journal of Public Health Research & Development 2019; 10: 3574.
6. Prathap L, Jagadeesan V, Suganthirababu P, et al. Association of quantitative and qualitative dermatoglyphic variable and DNA polymorphism in female breast cancer population. Online J Health Allied Scs 2017; 16: 2.
7. Lavanya J, Vijayakumar J, Sudhakar N, et al. Analysis of DNA repair genetic polymorphism in breast cancer population. Int J Pharma Bio Sci 2015; 6: B966–B73.
8. Lavanya J, Saraswathi P, Vijayakumar J, et al. Analysis of dematoglyphic traits in patients with breast cancer. J Pharm Biomed Sci; 23, https://www.researchgate.net/profile/Prathap_Suganthirababu/publication/277957793_Analysis_of_Dermatoglyphic_traits_in_patients_with_breast_cancer/links/5577c65308aeacff20004f50/Analysis-of-Dermatoglyphic-traits-in-patients-with-breast-cancer.pdf (2012).
9. George SM. An Assessment of Correlation between Dermatoglyphic Patterns and Sagittal Skeletal Discrepancies. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. Epub ahead of print 2017. DOI: 10.7860/jcdr/2017/22688.9538.
10. Sekar D, Lakshmanan G, Mani P, et al. Methylation-dependent circulating microRNA 510 in preeclampsia patients. Hypertens Res 2019; 42: 1647–1648.
11. Krishna RN, Nivesh Krishna R, YuvarajBabu K. Estimation of stature from physiognomic facial length and morphological facial length. Research Journal of Pharmacy and Technology 2016; 9: 2071.
12. Subashri A, Thenmozhi MS. Occipital Emissary Foramina in Human Adult Skull and Their Clinical Implications. Research Journal of Pharmacy and Technology 2016; 9: 716.
13. Thejeswar EP, Thenmozhi MS. Educational Research-iPad System vs Textbook System. Research Journal of Pharmacy and Technology 2015; 8: 1158.
14. Pratha AA, AshwathaPratha A, Thenmozhi MS. A Study of Occurrence and Morphometric Analysis on Meningo Orbital Foramen. Research Journal of Pharmacy and Technology 2016; 9: 880.

15. Menon A, Thenmozhi MS. Correlation between thyroid function and obesity. Research Journal of Pharmacy and Technology 2016; 9: 1568.
16. Hafeez N, Thenmozhi. Accessory foramen in the middle cranial fossa. Research Journal of Pharmacy and Technology 2016; 9: 1880.
17. Johnson J, Lakshmanan G, M B, et al. Computational identification of MiRNA-7110 from pulmonary arterial hypertension (PAH) ESTs: a new microRNA that links diabetes and PAH. Hypertens Res 2020; 43: 360–362.
18. Seppan P, Muhammed I, Mohanraj KG, et al. Therapeutic potential of Mucunapruriens (Linn.) on ageing induced damage in dorsal nerve of the penis and its implication on erectile function: an experimental study using albino rats. The Aging Male 2018; 1–14.
19. Nandhini JST, ThaslimaNandhini JS, YuvarajBabu K, et al. Size, Shape, Prominence and Localization of Gerdy's Tubercle in Dry Human Tibial Bones. Research Journal of Pharmacy and Technology 2018; 11: 3604.
20. Sriram N, Thenmozhi, Yuvaraj S. Effects of Mobile Phone Radiation on Brain: A questionnaire based study. Research Journal of Pharmacy and Technology 2015; 8: 867.
21. Keerthana B, Thenmozhi MS. Occurrence of foramen of huschke and its clinical significance. Research Journal of Pharmacy and Technology 2016; 9: 1835.
22. Samuel AR, Thenmozhi MS. Study of impaired vision due to Amblyopia. Research Journal of Pharmacy and Technology 2015; 8: 912.
23. Choudhari S, Thenmozhi MS. Occurrence and Importance of Posterior Condylar Foramen. Research Journal of Pharmacy and Technology 2016; 9: 1083.
24. Kannan R, Thenmozhi MS. Morphometric Study of Styloid Process and its Clinical Importance on Eagle's Syndrome. Research Journal of Pharmacy and Technology 2016; 9: 1137.
25. Tikare S, Rajesh G, Prasad KW, et al. Dermatoglyphics--a marker for malocclusion? Int Dent J 2010; 60: 300–304.
26. Kaur K, Mahajan N, Singh A, et al. Dermatoglyphic patterns in children with dental caries: An In vivo Study. Indian Journal of Dental Sciences 2018; 10: 16.
27. Anitha C, Konde S, Raj NS, et al. Dermatoglyphics: a genetic marker of early childhood caries. J Indian SocPedodPrev Dent 2014; 32: 220–224.
28. Gupta M, Abhilash PR, Divyashree R, et al. Dermatoglyphics in Patients with Dental Caries: A Study on 1250 Individuals. The Journal of Contemporary Dental Practice 2012; 13: 266–274.
29. Girish HC, Sharada P, Priya NS, et al. Dermatoglyphics in Dentistry: An Insight. World Journal of Dentistry 2013; 4: 144–147.
30. Sankar SG. A Comparative Study of Dermatoglyphics in Individuals with Normal Occlusions and Malocclusions. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. Epub ahead of print 2013. DOI: 10.7860/jcdr/2013/7663.3853.