



## RESEARCH ARTICLE

### ASSESSMENT OF DENTAL CARIES AMONG 12-15 YEAR CHILDREN THROUGH DERMATOGLYPHICS-A CASE CONTROL STUDY IN MURADNAGAR, GHAZIABAD, UP

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#### ABSTRACT

**Aim:** This study aimed to assess the relationship between hand prints patterns and dental caries among 12 and 15 yr children in Muradnagar, Ghaziabad, U.P. **Materials and Methods:** The study sample consisted of 100 children aged between 12 and 15 years, divided into two groups of 50 children each. For collection of data, a pro forma was used consisting of demographic details, brief case history regarding sugar consumption, oral hygiene methods and fingerprints and recording format of Dentition status. Finger prints were recorded with duplicating ink described by Cummins and Midlo. Caries experience was clinically assessed by Dentition status and treatment needs and OHI-S. Statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version 20.0. Results were found statistically significant with p-value equal or less than 0.05. **Result:** A study comprises of 100 children who were equally divided in study (caries group) and control group (caries free group), out of which 51% were male and 49% were female. 52% do not clean their teeth and 88% clean their teeth in caries free group. Majority of individuals in caries group have whorl pattern followed by loop pattern. Loop pattern was dominant among caries free group. **Conclusion:** In this study, central pocket whorl were found to have an association with an increase in dental caries experience. There is a definite correlation between fingerprint patterns and dental caries. Thus, the dermatoglyphics gives a hope in the prediction of dental caries much before its initiation giving a sufficient time to implement preventive measures.

**Key words:** Dermatoglyphics, Muradnagar, Finger print, Dental caries.

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#### INTRODUCTION

"Dermatoglyphics" is a harmonious blend of two words Derma which means skin and Glyphe meaning carve. It gives the impression that something has been carved out of the skin. Cummins in the year 1926 coined the term dermatoglyphics to this field of science and is regarded as the "Father of Dermatoglyphics (Chinmaya, 2016)." The term "fingerprint" predominantly means an impression of the epidermal ridges of the fleshy distal portion of a finger formed by applying in and pressing the finger on paper and is used as means of establishing identification. They are unique to all individuals and remain unchanged over the lifetime. Dermatoglyphics is the scientific study of finger prints from palms, fingers, soles and toes of humans and animals. There is formation of ridges which are epidermal in origin and develop on the volar surfaces. The ridges formed are of two types namely the primary and secondary ridges (Abhilash, 2012).

There is increase in number of ridges from the adjoining ones and primary ridge formation is responsible for the dermatoglyphics pattern. Secondary ridges are modified into sebaceous glands and are found at the apex of the primary ridges at regular intervals. Ridges are the areas which decompose in the last after a person dies. The fingerprints are permanent and are not the same even in monozygotic twins (Naffah, 1977). Despite great achievements in oral health of populations globally many people are still affected by dental caries, only the severity differs. There is interplay of three principal factors, the host, the micro flora and the substrate or diet in the occurrence of dental caries. In addition, the fourth factor time must be considered in any discussion regarding etiology of caries. This study aimed to assess the relationship between hand prints patterns and dental caries among 12 and 15 yr children in Muradnagar, Gzb, U.P.

#### MATERIALS AND METHODS

A cross-sectional study was conducted in the outpatient department of Department of Public Health Dentistry of ITS Dental College, Muradnagar, and Ghaziabad, India. Children

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belonging to the age group of 12 and 15yr were selected. The study comprised of 100 children who were divided in study group (caries group) and control group (caries free group). The study was conducted for 2 months between August and September 2016. Permission obtained through informed written consent forms from parents and children before recording the fingerprints. Before starting the study ethical clearance was obtained from the ethical committee of ITS-CDSR Muradnagar. Calibration of the principal investigator was done in the Department of Public Health Dentistry ITS CDSR Muradnagar, Ghaziabad to limit the examiner variability. For collection of data, a pro forma was used consisting of demographic details, brief case history regarding sugar consumption, oral hygiene methods and fingerprints and recording format of Dentition status. A4 size plain paper, cotton, stamp pad, soap, gloves, magnifying lens, scale, protractor, micro tip pencil and eraser, oil, and case sheets were used as armamentarium.

### Inclusion criteria

- Child's age between 12-15 years present on day of examination

### Exclusion criterion

- Children with special health needs.
- Children underdoing orthodontic treatment

Procedure for recording Finger Prints and Dental Caries. InkPad Method was used to record the fingerprints of subjects. Children's hands were washed with soap and water to eradicate any dirt and oil from the ridged skin and were air dried to improve the quality of finger and palm prints. Their finger prints were recorded with duplicating ink described by Cummins and Midlo. Prints were dried and studied with the help of fingerprint expert using a magnifying lens ( $\times 10$ ) to identify and obtain the dermatoglyphic patterns of fingertips. After taking the imprints of all fingers, ink was removed properly. Care was taken while recording the prints to apply the stamp ink material in adequate amounts. The handprints obtained were checked for their clarity with a magnifying glass ( $\times 2$ ) and coded. Caries experience was clinically assessed by Dentition status and treatment needs and OHI-S.

### Statistical analysis

Statistical analysis was done by using Statistical Package for Social Sciences (SPSS) version 20.0. Results were found Statistical significant with p-value equal or less than 0.05. Data was statistically compiled and master table was prepared in computer after conversion of data from a pre-coded proforma to the computer. Meaningful distribution and presentation of data was done in tables and diagrams.

## RESULTS

A study comprises of 100 children who were equally divided in study (caries group) and control group (caries free group), out of which 51% were male and 49% were female (Fig 1). Table 1 reveals, in caries group, 52% do not clean their teeth and 88% clean their teeth in caries free group. Most of children used tooth brush and paste to clean their teeth, in both the groups respectively. Fig. 2 reveals that 37 individuals among caries group were vegetarian and 19 individuals among caries

free were taking mixed diet. Fig. 3 demonstrates among caries group 06 individuals have good, 28 fair and 16 have poor oral hygiene scores. In caries free group majority of individuals i.e. 27 have good oral hygiene score.

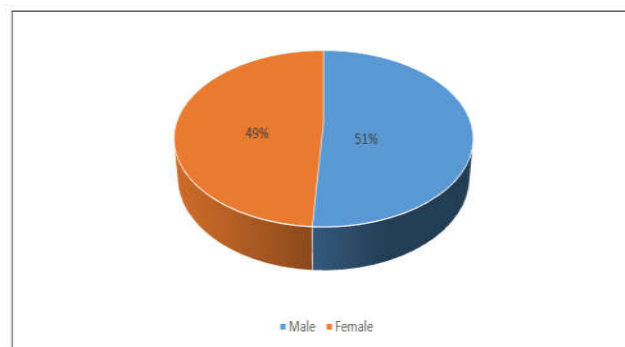


Fig. 1. Distribution of study population on the basis of gender

Table 1. Responses of the study population

Question		Group I Caries N=50	Group II Caries free N=50
Do you clean your Teeth?	Yes	26(52%)	44(88%)
	No	24(48%)	8(12%)
How do you clean your teeth?	Tooth Brush & Tooth Paste	29(58%)	36(72%)
	Tooth Brush & Tooth Powder	8(16%)	5(10%)
	Tooth Paste & Finger	4(8%)	5(10%)
	Tooth Powder & Finger	5(10%)	2(4%)
	Tooth Powder & Finger	2(4%)	1(2%)
	Neem stick / Datoon	2(4%)	0
	Thread /Dental floss	0	1(2%)

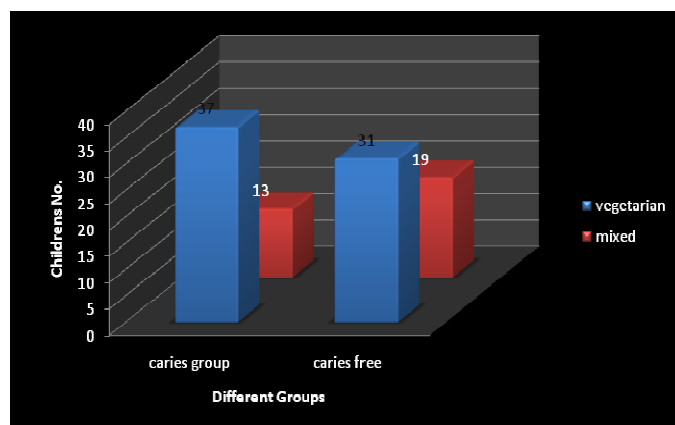


Fig. 2. Association of Diet with Different Group

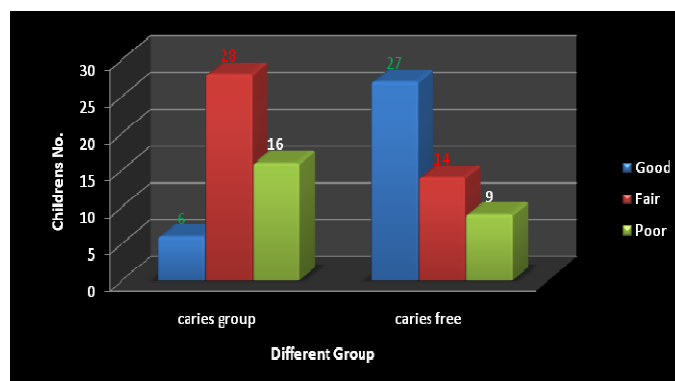


Fig. 3. Association of OHI with Different groups

Fig. 4 reveals distribution of different pattern with different group. Majority of individuals in caries group have whorl pattern followed by loop pattern (16). Loop pattern was dominate among caries free group i.e. 22 followed by whorl and double whorl (8 each respectively).

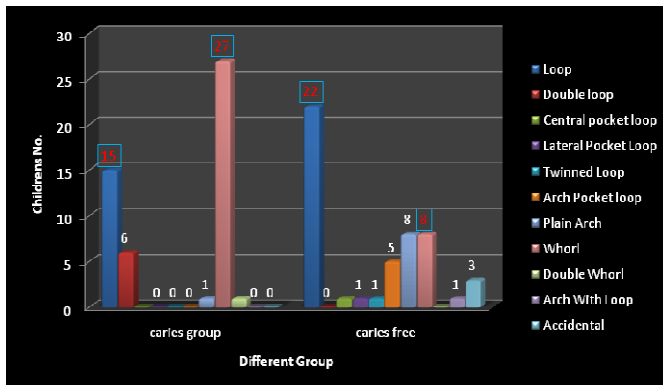


Fig. 4. Association of Different pattern with Different Group

## DISCUSSION

- Dental caries is a microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth.
- It is a chronic, complex, multifactorial disease for which a multitude of etiologies such as host and environmental factors have been proposed (Gyula, 2000).
- It is critical to realize that genes and environment do not act independent of each other and the appearance or magnitude of heritability may differ with various environments (Natekar, 2006).
- The dermatoglyphic patterns can be used as an oral health marker, which can determine the genetic predisposition of individual to dental caries (Latti, 2013)
- The type of fingerprints is unique and unalterable and is based on the genetic constitution of each individual.
- These dermal patterns once formed remain constant throughout life and also the impression recording or fingerprint can be accomplished rapidly, inexpensively and without causing any trauma to the patient (Soni, 2013)
- In this study, the dermatoglyphic patterns varied significantly among the subjects.
- This study depicted that dental caries susceptibility of individual increase with an increase in the incidence of whorl pattern. Similar findings were reported in studies conducted by Ekta Singh *et al* (Singh, 2016).
- In the study by Abhilash *et al* dental caries susceptibility of an individual increases with an increase in the incidence of (83%) and it was decreased with incidence of loop pattern and in the study by nidhi *et al* the result showed that the caries group showed maximum occurrence of whorls (Abhilash, 2012).
- The whorl pattern of fingerprint was found to be more prevalent in students having the highest mean of dental caries (2.82).
- The findings of this study found to be similar to the studies conducted by Vijender *et al.*, Madan *et al.*, and Sengupta *et al.*, which showed a significant change in

the dermatoglyphic pattern between the caries and the caries free group and reported frequency of whorls more in caries group and the frequency of loops more in caries free group.

1. Arch, 2. Loop, 3. Whorl, 4. Central pocket Loop
5. Twinned Loop



## Conclusion

- In this study, Whorl were found to have an association with an increase in dental caries experience.
- There is a definite correlation between fingerprint patterns and dental caries. Thus, the dermatoglyphics gives a hope in the prediction of dental caries much before its initiation giving a sufficient time to implement preventive measures.
- In a developing country like India, it might prove to be a non invasive, inexpensive, and effective indicator for dental caries.

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