

Dermatoglyphics in Cleft Lip and Palate- Let's Paint the Mark without A Grid**C. Chrishantha Joybell¹, M. Kawin Kumar², V. Suresh Kumar³, Ramesh Krishnan⁴**

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ABSTRACT:

Background: Dermatoglyphics is the scientific study of fingerprints. Specific dermatoglyphic pattern exists for congenital Cleft Lip(CL) with or without Cleft Palate(CP) and isolated CP anomalies. The influence of genetics and environmental factors on early development of these friction ridges has been used in clinical genetics as a diagnostic tool.

Objective: To understand the unique patterns of finger prints in CLP children and to determine its correlation.

Settings and Design: Cross sectional study

Materials and Methods: The study was carried out in 100 surgically managed Cleft lip palate children between the ages of 4- 15 yrs. A palm print scanner was used to record the dermatoglyphic patterns.

Statistical analysis used: All the data were analysed using SPSS 11.5 software for evaluation using the Chi square test.

Results: A wide atd angle was present in 64% of the children, Sydney line in 58% and Simian crease was present in 64% of the children. The characteristic d line termination was absent in 63% of the children. Ulnar loop is the common type of finger print pattern in CLP patients.

Conclusion: The influence of genetics and environmental factors on early development are often reflected by the altered dermatoglyphics, and it can be used as a valuable tool in genetics for CLP children.

Key words: Cleft lip(CL), Cleft palate(CP), Cleft lip and palate(CLP), Dermatoglyphics.

INTRODUCTION

A cleft is a fissure or an opening.¹ Cleft lip and palate is the second commonest birth defect. It can occur as a single entity or together as cleft lip and palate. If the cleft does not involve the palate it is referred to as cleft lip. Cleft lip and palate occur in about 1 per 500-700 of all births.² It occurs in about one in 800 white births, one in 2000 black births and one in 500 Japanese births. The frequency of orofacial clefts vary according to the investigator and the country, across ethnic groups and geographic areas. In India, cleft lip and palate occurs approximately 1.4 per 1000 live births and a marked racial variation is seen in the incidence of Cleft lip and palate.³

Dermatoglyphics is the scientific study of fingerprints. This term was coined by Dr. Harold Cummins, the father of American fingerprint analysis. The word dermatoglyphics comes from two Greek words (derma, skin and glyph, carve) and refers to the friction ridge formations which appear on the palms of the hands and soles of the feet. Specific dermatoglyphic pattern exists for congenital Cleft Lip(CL) with or without Cleft Palate(CP) and isolated CP anomalies.⁴

The influence of genetics and environmental factors on early development of these friction ridges are often reflected by the altered dermatoglyphics, and it has been used in clinical genetics as a diagnostic tool.

Keeping this in mind, the aim of the present study was to evaluate whether any correlation exists for Cleft Lip and Palate with their dermatoglyphic pattern, which can serve as a diagnostic tool for early detection of dental anomalies.

MATERIALS AND METHODS

The study was conducted among 100 children who were surgically managed for CLP by the Smile train association at Vinayaka Misions Hitech Hospital, Ariyanoor, Salem. The children were between the age group of 4- 15 yrs of which 57 were males and 43 were females. Informed written consent was obtained from the parents of each child who participated in the study. Before commencement of the study, ethical committee clearance was obtained from the institutional ethical committee board. (Ref:VMSDC/IEC/Approval No.014).

A detailed medical, personal and family history was elicited from the children and their parents. All the details were recorded on a printed proforma. A thorough intraoral and extraoral examination was done under visible daylight (Figure 1,2,5). Intraoral and extraoral photographs were recorded using a digital camera.

PATIENT EXAMINATION & RECORDING OF FINGER PRINTS



Figure 1: Armamentarium



Figure 2: Protective measures undertaken

PATIENT EXAMINATION & RECORDING OF FINGER PRINTS

A palm print scanner (Figure 3) was used to record the dermatoglyphic patterns (Figure 7). The memory card in the scanner recorded the images in jpeg format which were transferred to the laptop via the USB cable (Figure 6). The images of the palms were analysed in the computer by zooming the images and the following five characteristic dermatoglyphic features were noted down in the proforma, viz.,

- d line termination (Figure 8)
- atd angle (Figure 9)
- Sydney line (Figure 10)
- Simian crease (Figure 11)
- Pattern of finger prints (Figure 12, 13, 14)

All the data obtained was entered in excel sheets and the results were tabulated. Chi square test was used to analyse the data with SPSS 11.5 software.



Figure 3: Palm Print Scanner



Figure 4: Palm print scanner connected to laptop for image transfer



Figure 5: Examination of patient



Figure 6: Recording the dermatoglyphic patterns



Figure 7: Palm print that was recorded



Figure 8: d line termination

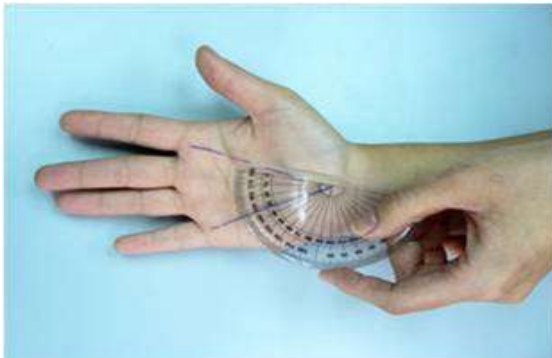


Figure 9: atd angle

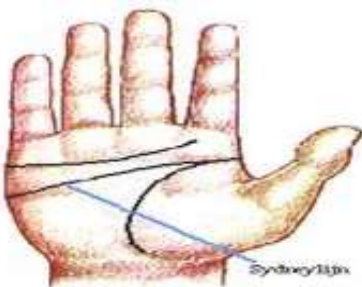


Figure 10: Sydney line



Figure 11: Simian crease

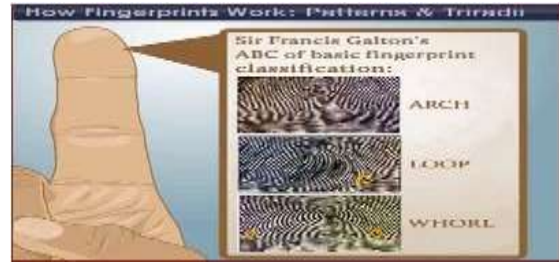


Figure 12: Finger print pattern

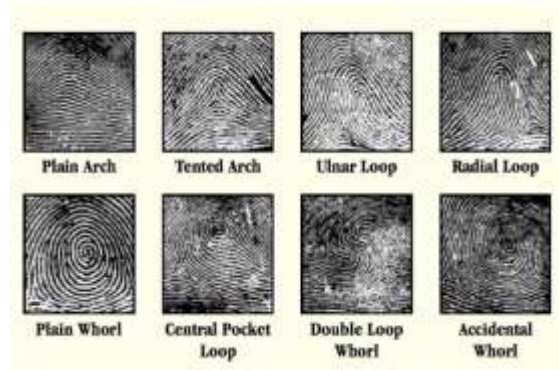


Figure 13: Different types of finger print pattern



Figure 14: Distinguishing dermatoglyphic pattern

RESULTS

The overall distribution of children with CLP showed UCLP with 51% followed by BCLP with 29% and CL with 13% (Table 1).

Table 2 illustrates the varying dermatoglyphic patterns in the operated CLP cases. The wider atd angle is seen in 64% of the children whereas 58% showed the presence of Sydney line, 64% showed presence of Simian crease, 63% showed d line termination. The commonest pattern of finger print observed in the present study among the CLP children is the ulnar pattern seen in 43% of the children.

Table 3 shows the correlation b/w the distribution of cleft deformity and dermatoglyphic patterns. Ulnar loop is the commonly observed finger print pattern with the d line termination being absent in 34% of the children with unilateral CLP deformity. It is found that 34% of the UCLP children have wider atd angle with 31% of them showing presence of Sydney line and 32% with Simian crease. 7% of the CL children have wider atd angle with 9% of them showing presence of Sydney line, 8% with Simian crease and 4% show absence of d line termination. 17% of the BCLP children have wider atd angle with 15% of them showing presence of Sydney line, 21% with Simian crease and 20% show absence of d line termination.

Table 1- Distribution of the cleft deformity in Cleft lip palate cases

Distribution of cleft Deformity	Sex				Total	
	Male		Female		N	%
	N	%	N	%		
Bilateral CLP	15	15	14	14	29	29
Unilateral CLP	33	33	18	18	51	51
Cleft of lip only	6	6	7	7	13	13
Cleft of palate only	1	1	1	1	2	2
Median cleft	2	2	3	3	5	5
Total	57	57	43	43	100	100

Table 2- Dermatoglyphic pattern in the children operated for CLP

	Yes		No		Total
	N	%	N	%	
Wider atd angle	64	64	36	36	100
Sydney line present	58	58	42	42	100
Simian crease present	64	64	36	36	100
Arch pattern	17	17	83	83	100
Ulnar loop	43	43	57	57	100
Radial loop	30	30	70	70	100
Whorl pattern	11	11	89	89	100
D line termination absent	63	63	37	37	100

DISCUSSION

Dermatoglyphics deals with the study of fine patterned dermal ridges on volar surfaces of soles, palms and ridges. The volar pads are mound shaped elevations on each finger above the proximal end on the distal metacarpal bone.⁵ It is unique for each person, and is not same even in monozygotic twins. Studying them can be useful in diagnosing certain genetic disorders, oral diseases and also in forensic science.⁶

The influence of various genetics and environmental factors on early development are often reflected by the altered dermatoglyphics, and this has been used in clinical genetics as a diagnostic tool. The relationship between CLP and dermatoglyphics was reported by Woolf and Gianas (1976)⁷ and Babler (1991).⁸

Runjhun Subhanand Saxena et al (2013)⁹ and Naveen Reddy Admala et al (2014)¹⁰ proposed that dermatoglyphics in CLP can be used to study the genetic etiology of CLP and it can serve as an educational tool for genetic counseling.

So in this study, we intended to evaluate whether any correlation exists in these CLP children with their dermatoglyphic pattern, which can serve as a diagnostic tool for early detection of dental anomalies.

In the present study, five characteristic dermatoglyphic features were assessed., viz., atd angle, Sydney line, Simian crease, pattern of prints, and d line termination.

A wide atd angle was present in 64% of the children, Sydney line in 58% and Simian crease was present in 64% of the children who were evaluated in the present study.

The characteristic d line termination was absent in 63% of the children. This was in accordance to a study reported by R.S.Balgir (1992)¹¹ who suggested that the atd angle was more wider and the d line termination was absent in CLP individuals. He also reported that Sydney line and Simian crease was significantly present in higher frequency in cases of CLP.

Table 3- Correlation b/w the distribution of cleft deformity and dermatoglyphic pattern

		Distribution of cleft deformity												Total
				Unilateral cleft lip and palate		Cleft of lip only		Cleft of palate only		Median cleft		Bilateral cleft lip and palate		
		N	%	N	%	N	%	N	%	N	%	N	%	
Wider atd angle	Yes	2	2	34	34	7	7	2	2	2	2	17	17	64
	No	1	1	17	17	6	6					12	12	36
Sydney line present	Yes			31	31	9	9	2	2	1	1	15	15	58
	No	3	3	20	20	4	4			1	1	14	14	42
Simian crease present	Yes	1	1	32	32	8	8	1	1	1	1	21	21	64
	No	2	2	19	19	5	5	1	1	1	1	8	8	36
Arch pattern	Yes			7	7	4	4	1	1			5	5	17
	No	3	3	44	44	9	9	1	1	2	2	24	24	83
Ulnar loop	Yes	1	1	23	23	5	5	1	1			13	13	43
	No	2	2	28	28	8	8	1	1	2	2	16	16	57
Radial loop	Yes	2	2	17	17	4	4			1	1	6	6	30
	No	1	1	34	34	9	9	2	2	1	1	23	23	70
Whorl pattern	Yes			4	4	1	1			1	1	5	5	11
	No	3	3	47	47	12	12	2	2	1	1	24	24	89
D line termination absent	Yes	2	2	34	34	4	4	2	2	1	1	20	20	63
	No	1	1	17	17	9	9			1	1	9	9	37
Total		3	3	51	51	13	13	2	2	2	2	29	29	100

Ulnar loop is the common type of finger print pattern in CLP patients. In the present study it was present in 43% of the patients, which tends to be similar to other studies reported by Nichole M Scott et al (2002)¹², Deshmukh et al (1981)¹³ and L. Mathew et al (2005)¹⁴ where the frequency of ulnar loops were significantly increased in CLP patients.

The dermatoglyphic pattern obtained from the present study are found to a larger extent compatible with the findings of other investigators. This compatibility of findings further strengthens their role and the use of dermatoglyphics in the etiological studies of CLP.

CONCLUSION

The influence of genetics and environmental factors on early development are often reflected by the altered dermatoglyphics, and it can be used as a valuable tool in genetics for CLP children.

“The greatest pleasure in life is doing what people say you cannot do”

- Walter Bagehot

And as far as professional responsibility, the true measure of a society lies in the way it treats its special citizens. If this is true, then we still have a long way to go.

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How to cite this article: Joybell CC, Kumar KM, Kumar SV, Krishnan R. Dermatoglyphics in Cleft Lip and Palate- Let's Paint the Mark without A Grid. *Arch of Dent and Med Res* 2018;4(1):1-6.