Original Article

Dermatoglyphic ulnar loops studies in Turner's syndrome

Aruna Y Yadav[1*], R B Vaidya[2], Supriya P Satpute[3]

[1]Lecturer, Department of Anatomy, Vasantdada Patil Dental College and Hospital, Kavalapur, Maharashtra, INDIA.
[2]Professor, Department of Anatomy, Bharti Vidyapeet Deemed university, Medical College and Hospital, Sangli, Maharashtra, INDIA.
[3]Tutor, Department of Anatomy, Prakash Institute of Medical Sciences, Islampur, Sangli, Maharastra, INDIA.
Email: radhachavan16281@gmail.com

Abstract

This study was carried out to compare the ulnar loops of dermatoglyphics in Turner's syndrome females and control females. Bilateral rolled finger prints and palm prints of 40 patients of Turner's syndrome were selected for present study. They were from the age group 14-20years. The Diagnosis was based upon clinical examination and chromosomal study, and patients with 45 XO karyotype were selected. As control normal healthy females from the same age group (i.e. 14 to 20 yrs) were selected. The incidence of ulnar loops increased in I3 and I4 area. It is higly significant in this area.
Keywords: Turner's syndrome, Dermatoglyphic ulnar loop.

[*]**Address for Correspondence:**
Dr. Aruna Y Yadav, Lecturer, Department of Anatomy, Vasantdada Patil Dental College and Hospital, Kavalapur, Maharashtra, INDIA.
Email: radhachavan16281@gmail.com
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INTRODUCTION

The word dermatoglyphics means carving on the skin. It is an important aspect of Surface Anatomy, Physical Anthropology, Forensic Medicine and Criminology. The external surface of skin is marked by furrows, ridges and other irregularities. Three principal varieties of surface markings exist. These are

1. Tension Lines
2. Flexure Creases(Joint Lines)
3. Papillary ridges

Papillary ridges

Papillary ridges are also known as epidermal ridges They are confined to palms, digits and soles. The apertures of sweat ducts open at regular intervals along the summit of each ridge. The epidermal ridges correspond to an underlying interlocking pattern of dermal papillae. The pattern of dermal papillae determines early development of epidermal ridges. This arrangement is stable throughout life, unique to the individual and therefore significant as a means of identification. Functionally epidermal ridges, increase gripping ability of hands and feet, preventing slipping. The great density of nerve endings beneath them also means that they are also important sensory structures. (Gray's Anatomy, 40Th edition). Dermatoglyphics which is study of papillary ridges and flexure lines has been studied extensively in chromosomal disorders, single-gene –disorders and in those disorders whose genetic basis is not clear.

Turner's syndrome

It is also referred to as X monosomy or Ovarian dysgenesis. It was first described by Turner in 1938. However, the precise nature of Cytogenetic abnormality was identified in 1959 by Ford *et al* at Harwell. The incidence reported by different workers varies from 1 in 2500 to 1 in 10,000.

Clinical features

The phenotype of these patients is female. Primary amenorrhea is present, They have a short stature, webbing of neck, and cubitus valgus, that is reduction in the carrying angle at elbow among other features, These patients have a low posterior hair line, broad chest with widely spaced nipples, lymphoedema over feet. Ovarian follicles, and secondary sexual characters do not develop. Axillary and pubic hair are sparse. Normal breast development does not occur at puberty and the external genitalia is of juvenile type, Slight mental retardation is present.

Cytogenetics

The classical karyotype in Turner's is 45XO. Dermatoglyphic studies in Turner syndrome in India are

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very few and the same holds true for number of cases. Hence the present study was undertaken.

MATERIAL AND METHOD

40 patients of Turner's syndrome were selected for present study. These were the patients examined and diagnosed as Turner's syndrome by Dr Milind Patvardhan (MD, D.M, DNB, Endocrinologist) Miraj. They were from the age group 14-20years. The Diagnosis was based upon clinical examination and chromosomal study, and patients with 45 XO karyotype were selected. As control normal healthy females from the same age group (i.e.14 to 20 yrs) were selected. Dermatoglyphics of palms and fingers of both patients and controls were recorded using standard ink method.

Material Used

1. Wooden table (of suitable height)
2. Porcelein tile
3. Cyclostyling ink
4. Rubber Roller
5. Wooden pad (for supporting the paper)
6. White drawing paper
7. Wooden-rod(for covering the hollow of palm)
8. Soap, water and towel.
9. Hand lens

Method

The method used in the present study was standard ink method The person whose dermatoglphics was to be recorded was made to clean both his hand (to remove sweat, oil and dirt) by washing them with soap and water and drying them with clean towel. Porcelein tile was put on the table. A small amount of Cyclostyling ink was spread over it by means of rubber-roller and a thin uniform film of ink was obtained on the tile. The distal phalanges of person's right hand were inked over the tile by firm pressure on the dorsum starting from little finger. The distal phalanges of the left hand were similarly inked. Drawing paper applied firmly over a wooden pad was used for recording the inked epidermal ridge patterns. Rolled finger-prints were recorded after applying uniform pressure on the drawing paper in the following order.

Right-Hand				
Thumb (R1)	Index (R2)	Middle (R3)	Ring (R4)	Little (R5)
Left –Hand				
Thumb (L1)	Index (L2)	Middle (L3)	Ring (L4)	Little (L5)

Palm prints of both hands were obtained after inking them with the help of rubber roller. Drawing paper was wrapped around a wooden rod placed on the table. The hand was horizontally placed against it and the rod was gradually rolled on the table. Complete palm impression, including the hollow of the palm was obtained over paper. Thus one set of finger prints and palm prints was obtained. The prints obtained were immediately examined with hand-lens and care was taken to include all essential details.

OBSERVATION AND RESULTS

Table 1: Frequency distribution of patterns in thenar, hypothenar and interdigital Area of right hand

Palmar area	Subject	Presence of Pattern	%	Significance
Th/I1	Turners	10	25	Not Significant
	Normal	11	27.5	
I2	Turners	0	0	-
	Normal	1	2.5	
I3	Turners	26	65	Not Significant
	Normal	32	80	
I4	Turners	14	35	Highly Significant
	Normal	28	70	
Hy	Turners	13	32.5	Not Significant
	Normal	7	17.5	

Table 2: Frequency distribution of patterns in thenar, hypothenar and interdigital areas of left hand of turners females and normal females

Palmar area	Subject	Presence of Pattern	%	Chi square	P Value	Significance
Th/I1	Turners	11	27.5	1.95	0.2	Not Significant
	Normal	5	1.25			
I2	Turners	1	0.25	0.72	0.5	Not Significant
	Normal	1	0.25			
I3	Turners	14	35	7.21	0	Highly Significant
	Normal	27	67.5			
I4	Turners	14	35	13	###	Highly Significant
	Normal	31	7.75			
Hy	Turners	7	1.75	0.1	0.8	Not Significant
	Normal	5	12.5			

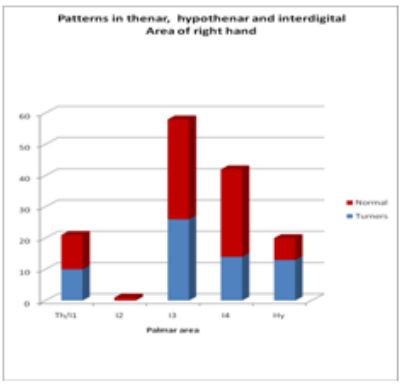

Figure 1

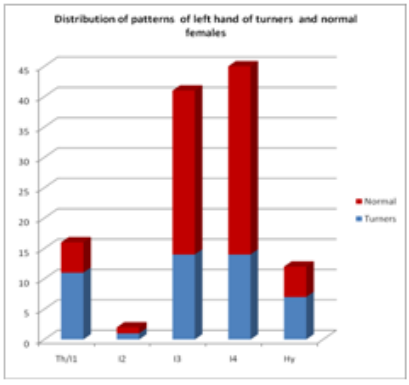

Figure 2

DISCUSSION

The study of dermatoglyphic in Turner's syndrome began after cytogenetic basis was detected in 1959. the first study of dermatoglyphic was done by Polani (1961) since then numerous workers (mentioned in Review of Literature) have carried out similar studies. Nancy and Uchida (1964) found an increased incidence of distal axial triradii and simian lines in Turner's patients. Forbes, JP (1964) found a high ridge count in the fingertip patterns, ↑ed incidence of Hypothenar patterns, distal axial triradii and Simian line. There was a definite tendency to vertical orientation of the ridges. Sakesena and Kumar (Indian)(1968) found that no patterns was seen in Th/I1 area and IV IDA area, Total frequency of whorls and loops, was 47.5% and 52.5% respectively. 5th finger alone showed whorls and ulnar loops in 75% and 25% resp. TFRC was between 164 and 196 with mean 176.2. Dallapicolla (1972) Identified five dermatoglyphic characteristics

1. ↑TFRC
2. ↑a-b ridge count.
3. Maximal atd angle.
4. ' t' line terminating in the second interdigital area.
5. Presence of Hypothenar patterns on palm).

Hattangdi, Vaidya and Mehta (1984) found that

a. Loops were increased (Controls 55; 16%, patients 66; 16%)
b. Whorls are reduced, The frequency of radial loops was↑.
c. I3 patterns ↑ for Rt hand
d. I4 patterns frequency was also ↑Rt hand.
e. Hypothenar patterns of both hand showed ↑ frequency.

(Most of Hypothenar patterns were ulnar loop.) High a-b count and smaller c-d counts. Bhalla,Marwaha Sharma, Trehan Murlidharan Bagga (2005) found that Predominance of ulnar loops, over other patterns, Mean TFRC↑.

The unique features(not reported by any other worker) of the present study are

Increased incidence of ulnar loop in I3 and I4 area.

SUMMARY AND CONCLUSION

Palmar Dermatoglyphic of 40 patients of Turner's Syndrome were recorded by Standard ink method. These patients were examined and diagnosed as Turner's patients by Endocrinologist Dr. Milind Patvardhan (MD, D.M, DNB) from Miraj. Their diagnosis was confirmed by Cytogenetic Studies. They were from age group 14-20. As control 40 normal healthy females from the same age group, free from any major illness were selected and their palmar dermatoglyphic were recorded by standard ink method. The analysis of the prints showed: Increased incidence of ulnar loop in I3 and I4 area. Also the size of samples use by previous workers in India has not been adequate. It is felt that, although, methods like karyotyping are available for confirming the diagnosis of Turner's syndrome, simple observation of ulnar loops in I3 and I4 area we can diagnose Turner's syndrome patient.

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