

# Dermatoglyphic studies in diabetes mellitus type II

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## Abstract

This study was carried out to compare the patterns of Dermatoglyphics in DM-II patients and controls from western Maharashtra population. Bilateral rolled finger prints and palm prints of 400 (Males- 200, Females-200) were analysed and compare with control of western Maharashtra population. It was evident from the analysis that there exist statistically significant difference between diabetic patients (both sexes) and control with regard to occurrence of digital and palmar patterns. Whorl pattern is increased significantly in the finger tips of diabetic females ( $p < 0.01$ ). Palmar pattern frequency in diabetic males is decreased significantly in right Th/I1 area ( $p < 0.05$ ), hypothenar area ( $p < 0.01$ ) and in left hypo thenar area ( $p < 0.0$ ).

**Keywords:** Dermatoglyphics, diabetes mellitus, palmar patterns.

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## INTRODUCTION

Dermatoglyphics are the skin carvings. They are the patterns formed by dermal ridges on the palms, fingers and soles during early intrauterine life between 7<sup>th</sup> and 21<sup>st</sup> week of gestation. During this period and only then genetic environmental factors can influence their formation. The word “DERMATOGLYPHICS” (derma-skin, glyphics-carvings) was first introduced in 1926 by the anatomist, Harold Cummins of Tulane university in united states. Diabetes has strong hereditary background. Off spring of two diabetic patients have 80% life time risk of developing diabetes. For the situations of DM II transmitted exclusively through maternal lines a significant part in its genesis is played by mitochondrial DNA, which encodes an important number of proteins with genetic defects responsible both for the manifestation of deficiencies in insulin secretion, and for sensibilisation of the peripheral tissues in the utilisation of their hormone for assuring insulin resistance. Positive

family history may be obtained in around 40% of NIDDM patients. Only 10% of the genes contributing susceptibility to DM II are known and they are primarily associated with uncommon subtypes of the disorder. The insulin receptor gene is present on chromosome 19P13 and at least 5 glucose transporter genes contribute to DM II.

## MATERIAL AND METHOD

In the present study finger prints and palmar prints were collected from 400 Diabetics (200 males and 200 females) in the age group of 40 years to 65 years and controls of 400 (200 males and 200 females) were collected within the same age group. Case history was taken including age, sex, family history, personal history. Consent was taken. The method for obtaining finger and palm prints in the present study was standard ink method. Preparation of the person whose finger and palm prints to be recorded was done as follows. The person was asked to clean both his hands to remove sweat, oil, and dirt by washing them with soap and water. Then the hands were dried with clean towel. The person were made roll the tip of their fingers and thumb one after the another from side to side across the surface of an already made ink stained pad, ensuring that the ink covered the entire pattern area. The finger was then transferred to a white paper and rolled from side to side across the duplicating paper to obtain the print. The palm of the person's hand was inked with the help of rubber roller. Then bond paper was wrapped around a wooden rod and the inked hand was gradually rolled around the rod and slight pressure on the

back of the hand was applied. Thus complete palm print along with ridges on the hollow palm were obtained satisfactorily over bond paper. The result was analysed statistically using chi-square test and data compared.

## OBSERVATION

The qualitative parameters observed are; Finger tip patterns, palmar patterns such as thenar, hypothenar, interdigital patterns, ridge dissociation. The data thus obtained has been computed for comparative study with previous authors. In the present study, there is significant increase in frequency of whorls ( $p < 0.01$ ) (37.85) in

diabetic females. Frequency of ulnar loops is increased in diabetic males (52.70%) as compared to normal males (50.60%). Frequency of radial loops is decreased in diabetic males (1.45%) as compared to normal males (1.7%). Diabetic males showed an increase (30%) in frequency of pattern in hypothenar area as compared to normal males (17%). This difference is highly significant. The study of palmar patterns in diabetic males showed decrease in frequency of pattern in right Th/I1 area 5% as compared to normal males (11%). Simian crease occurrence is increased in diabetics. Ridge dissociation occurrence is increased in diabetics.

**Table 1:** Frequency distribution of patterns in thenar, hypothenar and Interdigital areas of right hand of diabetic Males and normal Males

Palmar area	Subject	Presence of pattern	%	Absence of pattern	%	$\chi^2$	P value
Th/I1	Diabetic	10	5	190	95	4.110	0.043
	Normal	22	11	178	89		
I2	Diabetic	18	9	182	91	1.603	0.206
	Normal	27	13.5	173	86.5		
I3	Diabetic	127	63.5	73	36.5	2.987	0.084
	Normal	109	54.5	91	45.5		
I4	Diabetic	99	44.5	101	50.5	1.968	0.161
	Normal	114	57	86	43		
Hy	Diabetic	64	30	140	70	8.691	0.03
	Normal	34	17	166	83		

## DISCUSSION

The present study shows an increase in frequency of whorls in diabetic females. This finding agrees with SM Sant *et al* (2006). Present study shows an increase in ulnar loops in diabetic males. This finding is similar to R Ravindranath *et al* (1994), Vera M *et al* (1995) and PS Igbigbi (2001). In present study frequency of radial loops is decreased in diabetic males and is similar to SM Sant. In present study diabetics showed an increase in occurrence of simian crease and is similar to Li Yanhua Wushoushan.

## CONCLUSION

The study attempts to analyze whether there exists any pattern specific for diabetes mellitus-II and whether these pattern point a finger at individual who are likely to suffer from DM-II. Though there are some advantages of dermatoglyphic triats as a diagnostic tool, it has its own limitations when used alone in an individual case. However, when it is combined with other clinical features it plays an additive role in the diagnosis of medical disorders. When dermatoglyphic triats are studied in association with clinical features of DM-II they may confirm the diagnosis. Further studies in large population

including DM, Metabolic syndrome and Diabetic Dyslipidaemias should throw more light in this field. IRDS (Diabetes risk score) developed by Dr. Mohan is useful to decide who should undergo screening for dermatoglyphic criteria and in this score it can be an interesting addition.

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