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Research article

COMPARATIVE STUDY OF THE DERMATOGLYPHIC PATTERNS IN TYPE II DIABETES MELLITUS PATIENTS WITH NON DIABETICS

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ABSTRACT

Aim: To compare the differences in the finger print patterns viz., total finger ridge count (TFRC), a-b ridge count and atd angle in patients with type II diabetes mellitus with non-diabetic as control group **Materials and methods:** The study is conducted in 75 type II diabetic patients and 75 non-diabetic persons as a control group. A sample of 51 male and 24 female patients suffering from type II diabetes mellitus in the age group of 30 to 60 years has been examined and compared with 75 normal persons (47 males and 28 females) in the same age group to know the difference in fingerprint patterns. We have also compared total finger ridge count, a-b ridge count and atd angle. For collection of palmar prints 'Purvis Smith' method has been used. **Results:** Increase in number of whorls, total finger ridge count, a-b ridge count along with wider atd angle in type II diabetes mellitus patients. The result of the present study is more or less coincides with the observations of the earlier researchers. **Conclusion:** This inference may be widely applied clinically for the early diagnosis of type II diabetes mellitus mainly in a mass screening of a population as an additional diagnostic tool.

Keywords: Type II Diabetes mellitus, Dermatoglyphic patterns, Total finger ridge count, a-b ridge count, atd angle.

INTRODUCTION

Diabetes mellitus, or simply diabetes, is a metabolic disorder in which a person has high blood glucose level, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced.[1] Type 2 Diabetes mellitus results from insulin resistance, it is a condition in which cells fail to utilise insulin properly, sometimes combined with an absolute insulin deficiency.[2] This form of diabetes was previously referred to as non insulin-dependent diabetes mellitus (NIDDM) or "adult-onset diabetes".

Dermatoglyphics is the study of skin markings produced by the ridges on hands and feet. Dermatoglyphics is used as a way of measuring gene expression determined by the early pre-natal environment.[3]On each fingertip, the number of dermal ridges (the ridge count) provides a

measure of fingertip growth activity during the early foetal period. These dermal ridges are formed during gestational weeks 12–19, and the resulting fingertip ridge appearance (i.e., Fingerprint) is fixed permanently and because of these reasons dermatoglyphics becomes an identification marker for Diabetes.[4] According to Henry's[6] classification the dermatoglyphic patterns can be mainly recognised in to 3 forms, those are named as arch, whorl and loop. Arch is the pattern in which ridges are arranged in such a way that the delta is absent. Whorl is the pattern in which two deltas are present and ridges are arranged circularly from the core. The loop is formed when the ridges pass on the same side from where it originate, in this pattern one delta is present along with core. The arch is again divided in to plain arch and tented arch. The whorl is subdivided into five types, these are plain whorl, meet whorl, double loop whorl, central pocket loop whorl and accidental whorl, likewise, the loop is having two types these are radial loop and ulnar loop.

The present study is aimed to analyse the dermatoglyphic patterns of the patients suffering from type II diabetes mellitus and compare with a random non diabetic population. The observations of the present study may apply clinically in the mass screening of diabetic mellitus patients in a random population in addition blood glucose level.

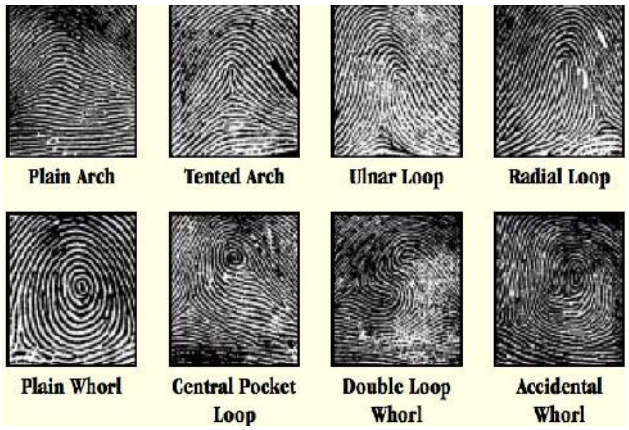

Fig1: Dermatoglyphic patterns of finger

MATERIALS AND METHOD

Sample for the present study comprises palmar prints of 75 clinically diagnosed Type II Diabetic patients of age group between 30-60years out of them 51 were males and 24 were female compared with same age group of 75 non-diabetic persons as control the group, Out of them 47 males and 28 females. The study was carried out in Vikhe Patil Hospital, Ahmednagar, Maharashtra, during the period of June 2012 to December 2012. Informed consent was obtained from the participants and ethical clearance was obtained from the institutional ethics committee prior to this study.

Exclusion criteria: Eliminated co-morbid patients with associated cardiac, renal and other life threatening diseases.

To collect the palmar prints black coloured duplicating ink, rubber roller, glass, bond paper were used. Patients were asked to wash their both hands with soap water. Then ink was spread on the glass with the help of roller and applied on their hands carefully. Afterwards palmar prints were taken on the bond paper by using 'Purvis-Smith method'.[7]

The ridges present on fingertip are counted from core to delta for each finger. The Triradius present below medial four fingers are named a,b,c and d starts from index finger to little finger, the Triradius present between thenar and hypothenar eminence were named as t. From the finger prints, the type of the pattern of the print, TFRC, a-b ridge count along with atd angle were find out, the results were recorded and photographed.[7]

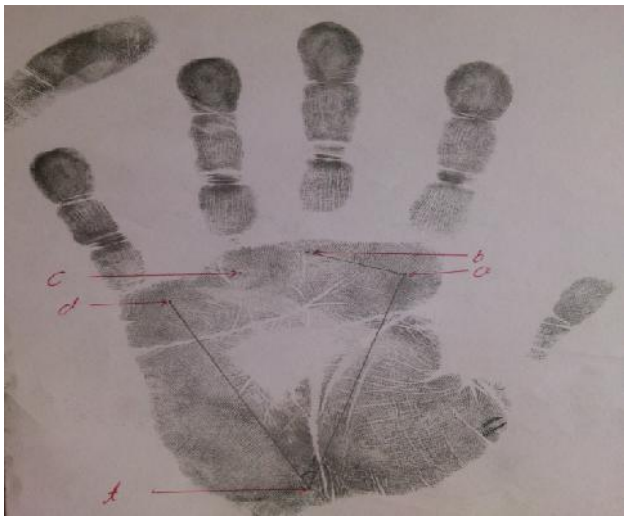

Fig 2: atd angle measurement.

RESULT

In the sample of 75 type II Diabetes Mellitus patients, we observed an increase in the number of whorls of both hands in males and females of compared with control group, while the frequency of ulnar loop was more in control group than diabetic patients. It has been found that total finger ridge count increased in diabetic patients along with a-b ridge count and atd angle when compared with normal population. Average of total finger ridge count measured in males is 74.62 in Rt hand, 73.60 in Lt hand and in females is 72.70 in Rt hand, 74.54 in Lt hand which is more as compared to 75 non-diabetic population, which shows average total finger ridge count of 67.02 on Rt hand and 69.17 on Lt hand in males while in females Rt hand 65.71 and Lt hand 61.89. The average a-b ridge count of diabetic patients is 36.00 on Rt hand, 37.00 on Lt hand in males and in females it is 34.66 on Rt hand, 35.33 on Lt hand which is more as compare to non-diabetic males counted 34.42 on Rt hand and 35.44 on Lt hand, in females 35.85 on Rt hand, 36.78 on Lt hand. The atd angle is wider in diabetic patients found in males 37.98° on Rt hand, 38.34° on Lt hand and in females 36.41° on Rt hand, 36.95° on Lt hand compared with non-diabetic males 37.98° on Rt hand, 39° on Lt hand and in females 36.41° on Rt hand, 36.95° on left hand.

Table 1: Fingerprint patterns in Diabetic population, Non Diabetic population (N=75)

Pattern		**Diabetic population**				**Non Diabetic population**			
		Male		Female		Male		Female	
		Right hand	Left hand	Right hand	Left hand	Right hand	Left hand	Right hand	Left hand
Arch	Plain	05	10	00	00	03	02	05	02
	Tented arch	05	06	00	00	09	05	00	04
	Total	26		00		19		11	
Loop	Ulnar	121	117	69	56	164	172	89	88
	Radial	03	06	01	04	03	04	02	06
	Total	247		130		343		185	
Whorls	Plain Whorl	79	78	34	43	40	12	22	16
	Meet whorl	07	02	02	00	03	03	01	00
	Central pocket loop	22	24	12	14	16	10	13	12
	Double loop	12	12	02	03	10	13	08	11
	Accidental	01	00	00	00	00	01	00	01
	Total	347		110		108		84	

Table 2: Ridge count and atd angle in Diabetic population, Non Diabetic population

	Diabetic population				**Non Diabetic population**			
	Male		Female		Male		Female	
	Right hand	Left hand	Right hand	Left hand	Right hand	Left hand	Right hand	Left hand
Total finger ridge count	74.62	73.60	72.70	74.54	67.02	69.17	65.71	61.89
a-b ridge count	36	37	34.66	35.33	34.42	35.44	35.85	36.78
atd angle	37.98	39	36.41	36.95	36.19	36.40	37.14	37.75

DISCUSSION

Several authors have studied the Dermatoglyphic patterns in type II Diabetes Mellitus patients and their findings were matching with the observations of the present study. Sant et al[8] reported an increased number of Whorls and decreased number of ulnar loops in type II Diabetic mellitus patients. The findings are similar with Knussmann et al[9] and Hirsch[5]. Barta et al[10] found higher TFRC in type II Diabetic patients. Vadgaonkar Rajinigandha et al[11] found increase TFRC in type II Diabetic patients. Rt hand 53.85, Lt hand 54.73 compared with control group Rt hand 44.73, Lt hand 44.70. She also observed wider atd angles in diabetes 52.13 in Rt hand and 52.51 in Lt hand which was compared with control group 43.60 in Rt hand and 44.26 in Lt hand. Iqbal et al[12] reported increased TFRC in non-insulin dependent diabetes mellitus patients. Sarthak Sengupta et al[13] reported increased frequency of whorls in male type II diabetic patients. However, Banarjee et al[14] Chakravartti[15] found a higher frequency of loops.

CONCLUSION

The current work emphasises increased number of whorl, decreased number of loops and arch in type II diabetes mellitus patients along with increased TFRC, a-b ridge count and wider atd angle in male while in females decreased tfrc, a-b ridge count and narrower atd angle as compared with non-diabetic population.

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