



SIGNIFICANCE OF ATD ANGLE IN MYOCARDIAL INFARCTION PATIENTS

Dr. Shashikant Mane*	Professor, Department of Anatomy, Krishna Institute of Medical Sciences "Deemed to be University", Karad. *Corresponding Author
Dr. Pravin Shingare	Professor, Department of Anatomy, Krishna Institute of Medical Sciences "Deemed to be University", Karad.
Dr. Prakash Jahagirdar	Professor and HOD, Department of Anatomy, Krishna Institute of Medical Sciences "Deemed to be University", Karad.
Dr. Sunila Jahagirdar	Professor, Department of Anatomy, Krishna Institute of Medical Sciences "Deemed to be University", Karad.

ABSTRACT

Introduction: Plenty of study has been done on etiology of Ischaemic Heart diseases. Our effort is to note any Dermatoglyphic angle for predisposition of Myocardial Infarction patients. That's why this study is undertaken.

Material & Methods: This study is done on Dermatoglyphic Palm Prints of 200 Myocardial Infarction patients (130 male & 70 female). Study is compared with Dermatoglyphic Palm Prints of Normal persons (130 male & 70 female).

Observations & Results: In female patients mean 'ATD' angle on Right hand is 41.36° and on Left hand is 41.07° . In male patients mean 'ATD' angle on Right hand is 41.21° and on Left hand is 41.68° .

Discussion & Summary: Myocardial infarction female patients have more frequency in 41° to 50° range and reduced frequency in 51° to 60° range in both the hands compared to the normal females. Myocardial infarction male patients have more frequency in 41° to 50° range and reduced frequency in 31° to 40° range in both the hands compared to the normal males. This indicates Dermatoglyphic study can be taken into consideration for prediagnosis of Myocardial Infarction Patients.

KEYWORDS : Dermatoglyphics, ATD angle, Dermatology, Myocardial Infarction, Ischaemic Heart disease.

INTRODUCTION:

This is a Dermatoglyphic study. The word Dermatoglyph is composed of two words, 'Dermal' which means skin and 'Glyph' meaning carving. Thus the study of epidermal ridges, patterns formed by them and flexion creases is known as Dermatoglyphics[1].

The development of dermatoglyphic traits possibly occurs at a much earlier embryonic state than their microscopically observed morphological signs[2]. Corrugated ridges of the skin on the palmar surface of Hand are known as friction ridges and are seen in all primates. They help to counteract slipping[3]. Corrugated ridges help in handling and grasping various objects. They also help in reception of tactile stimuli[4].

External surface of the skin is marked by furrows, ridges and other irregularities. Three principal varieties existing of the ridges are: Tension lines, Flexure lines and Papillary ridges (Epidermal ridges)[5]. In 1684, Dr. Nehemiah Grew, English Botanist, was the first person to document the description of the epidermal ridges which make characteristic patterns when finger tip prints are taken[6]. In 1926, Cummins and Midlo framed the term dermatoglyphics for the scientific study of ridge patterns. They were successful in showing differences in ridge pattern among different races of mankind[7].

Past research has demonstrated that the epidermal ridge patterns are under genetic influence[8]. A correlation between dermatoglyphics and certain diseases was suggested 30 years ago, almost half a century after Sir Francis Galton had linked dermatoglyphics with genetics[9]. Abnormalities in the appearance of finger and palm prints were greater in hereditary cases than in sporadic cases[10]. In 1788, Mayer stated for the first time that the arrangement of skin ridges was never the same in two individuals[11]. The formation of pattern is complete by about 18th week according to Miler and

Giroux[12]. While Mulvihill and Smith considered it to be over one week later at about 19th week of gestation[13].

Any possible correlation between Dermatoglyphics and Ischaemic Heart Disease will be a positive factor in favour of prediagnosis of Ischaemic Heart Disease and hence an attempt to study this.

MATERIAL AND METHODS:**Material used:**

Wooden table of suitable height, Porcelain tile. "Kores" duplicating ink, Cotton guage ball, White crystal bond paper, Spirit, Soap, water, towel, Magnifying lens.

Method:

The method used to collect the data for the resent study was standard ink method. The person whose finger and palm prints were to be recorded was made to wash Palm & Fingers first with soap and water. So that both hands were made free of oil, sweat and dirt, and wiped with clean towel. The porcelain tile was kept on table. A small amount of Kores duplicating ink was spread over it with help of cotton guage ball to obtain a thin uniform film of ink on the tile.

Palm prints:

Palmprints of both hands obtained after inking with the help of cotton guage ball. A uniform film of ink was obtained on the tile with cotton guage ball. Then with help of same cotton guage ball ink was spread uniformly on right hand. Then first the hand is extended at wrist joint and touched the paper kept on the table and then slowly whole of the hand is kept on the paper. Pressure is applied on the interphalangeal joints, head of metacarpals and dorsum of hand. With the help of fingers or blunt end of pencil little pressure is applied on the webspace between the fingers. Complete palm impression including the hollow of space was obtained over the paper. Same procedure was applied to left hand and palm prints of both hands were

obtained and recorded. The prints obtained were immediately examined with hand lens and care was taken to include all essential details.

The 'ATD' angle (Fig 1) and Palm Print showing ATD(atd) angle (Fig 2).

The 'ATD' angle is measured by taking reference of three points- A, T, and D. A(a) is digital triradius located proximal to the base of 2nd digit (Index finger). Triradius is formed by the confluence of three ridge systems. Ideally the Triradius is the meeting point of three ridges that form angles of approximately 120° with one another. T(t) is axial triradius. The triradius close to the palmar axis is termed as axial triradius. It is present normally near the proximal margin of palm and separates the thenar and hypothenar eminences. It is denoted as T or t and is usually not more than 10% of the distance between the distal crease of the wrist and proximal crease of the middle finger. D(d) is digital triradius located proximal to the base of 5th digit (Little finger).

The 'ATD' angle can be marked with lead pencil and measured by using transparent protractor of the variety which is constructed of semicircle of plastic material [14].

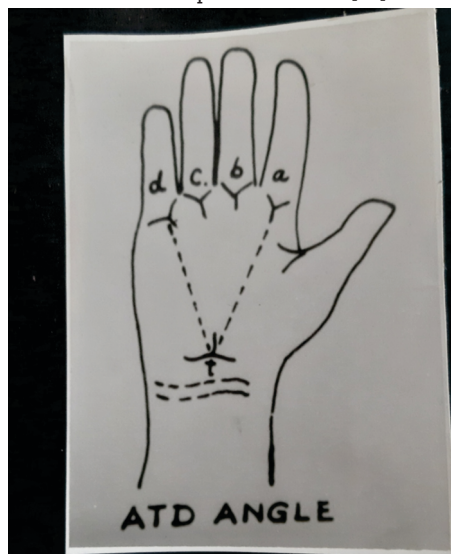


Fig- 1: Photograph showing ATD Angle

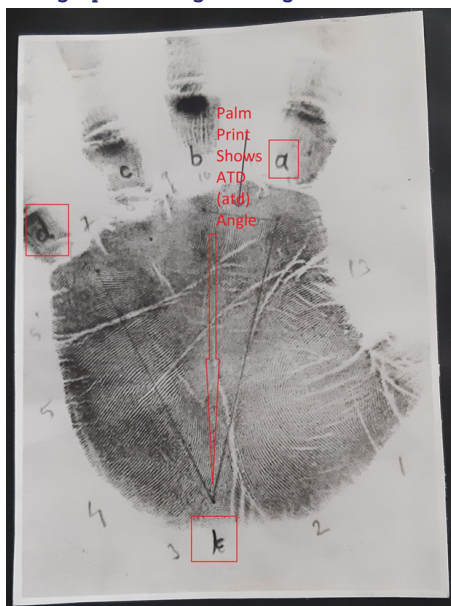


Fig- 2: Photograph of Palm Print showing ATD(atd) Angle

Collection of data:

With the help of above method finger and palm prints of 200 Myocardial Infarction patients, confirmed by electrocardiogram and clinical findings (130 males and 70 females) ranging from 29 yrs to 85yrs were obtained from:

Dr. S.V. Sortur's Clinic, Miraj; Krishna Hospital and Medical Research Center, Karad; Dr. Paramshetti's Hospital, Miraj; Dr. Bhatt's Parimal Hospital, Miraj; Dr. Mankapure's Polyclinic, Miraj; Mission Hospital, Miraj and Adhar Polyclinic, Sangli.

Finger and palm prints of 200 Normal persons (130 males and 70 females) were obtained from:

1st, 2nd and 3rd year students of Krishna Institute of Medical Sciences, Karad.

Staff of Krishna Hospital and Krishna Institute of Medical Sciences, Karad. And Resident persons of Vastala Nagar, Malkapur, Agashiv Nagar and relatives.

Findings of each case were recorded in separate forms. All the data was analysed qualitatively and quantitatively.

Observations & Results:

Mean 'ATD' angle in patients on right and left hands does not differ significantly from control (Table-1). Like in males, in female patients also mean 'ATD' angle on right and left hand does not differ significantly for control (Table-1).

Table- 1: Mean 'ATD' Angle

Sex	Hand	Control Mean (S.D.)	Patient Mean (S.D.)	Inference
Male	Left	41.68° (_+ 5.47)	41.70° (_+ 5.17)	t=0.03 ;P is more than 0.05; Not Significant
	Right	41.21° (_+ 5.38)	41.94° (_+ 5.27)	t=0.03 ;P is more than 0.05; Not Significant
Female	Left	41.07° (_+ 5.03)	41.04° (_+ 5.68)	t=0.03 ;P is more than 0.05; Not Significant
	Right	41.36° (_+ 5.10)	40.71° (_+ 4.49)	t=0.73 ;P is more than 0.05; Not Significant

Myocardial infarction male patients have more frequency in 41° to 50° range and reduced frequency in 31° to 40° range in both the hands compared to the normal males. While Myocardial infarction female patients have more frequency in 41° to 50° range and reduced frequency in 51° to 60° range in both the hands compared to the normal females.

Normal male and myocardial infarction patients do not differ significantly as regards the frequency of distribution of 'ATD' angle on right hand (x² = 5.77) and left hand (x² = 5.32).

Normal female and myocardial infarction patients also not differ significantly as regards the frequency of distribution of 'ATD' angle on right hand (x² = 2.82) and left hand (x² = 3.34).

Discussion and Summary:

Basically, "ATD" angle is used in interpretation the position of

Axial Triradius . "ATD" angle is formed by lines drawn from the digital triradius "A" and "D", to the axial triradius(T). If the Axial triradius (T) is more distal, the "ATD" angle is larger.

According to Our study, In Males ,Mean 'ATD' Angle of Left Hand in Myocardial Infarction patients is 41.70° and in control is 41.68° . Mean 'ATD' Angle of Right Hand in Myocardial Infarction patients is 41.94° and in control is 41.21° . In Females Mean 'ATD' Angle of Left Hand in Myocardial Infarction patients is 41.04° and in control is 41.07° . Mean 'ATD' Angle of Right Hand in Myocardial Infarction patients is 40.71° and in control is 41.36° . Like in Males, in Female Myocardial infarction patients also mean 'ATD' angle on right and left hand does not differ significantly for control.

As per the study of M Vashist et al, Atd angle varies from 30° to 65° in normal individuals[15].

Present study reveals ,Myocardial infarction Male patients have more frequency in 41° to 50° range and reduced frequency in 31° to 40° range in both the hands compared to the normal males. While Myocardial infarction Female patients have more frequency in 41° to 50° range and reduced frequency in 51° to 60° range in both the hands compared to the normal females.

According to A V Salunkhe et al, significant increase in mean value of atd angle in both sexes in Myocardial infarction patients was observed as compared to controls[16]. As per Rathva Ashish et al, There is increase in mean value of 'atd'angle in both sexes and in both hands with significant increase in Coronary Artery Diseases males[17]. As noted by Manara A et al, the mean 'atd' angle was wider in the patients than the controls[18]. As maintained by Suresh Sharma et al, Mean atd angle is decreased in both sexes and both hands[19].

Emily suggest that the "ATD" angle can be measured reliably, and further imply that measurement using a software program may provide an advantage over other methods[20]. As S B Gilligan concluded that the atd angle is influenced by multifactorial effect, including additive polygenes and possible environmental factors, such as intrauterine effects [21].

Triradial point is the meeting point of three ridges. Axial triradial point gets displaced in number of conditions such as Mongolism, the D1 syndrome, the broad thumb and great toe syndrome, Turner's syndrome and congenital heart defect[12]. As per the study of M Annapurna ,There is a Higher incidence of Multiple axial triradii in females [22]. Karthick et al mentions, Dermatoglyphics is considered as a window of congenital and intrauterine abnormalities[23].

On the basis of present available knowledge it can be said that the total ridge count has greater clarity in terms of heritability, followed by "ATD" angle and the patterns on the fingers and palms in that order[24]. So measurement of 'ATD' angle has special value in prediagnosis of Myocardial Infarction Patients.

The Present study therefore indicates that there is some genetic basis for Myocardial infarction and it is possible to certain extent to predict from dermatoglyphics individual proclivity for acquiring Myocardial infarction.

Conflict of Interest:

There is no conflict of interest amongst authors.

Acknowledgement:

We acknowledge great help given by Department of Preventive and Social Medicine.

REFERENCES:

1. Verma K.C. et al; Dermatoglyphics in Psoriasis; Indian Journal of Dermatology Venrol Lepr.; 1980; Vol: 46, Pp 28-30.
2. Boon JP and Nouliez A (1086); Development, growth and form in living systems; In Stanley and Ostrowsky(eds.); Growth and Form; Nato ASI Series; MartNiJhoff; Series E; nr 100.
3. Montagu Ashley M.F.; Finger, Palm, Toe and Sole Prints; An introduction to Physical Anthropology; 1960; 3rd edition; Charles C.Thomas Publisher, Pp: 581-582.
4. Hooton E.A.; Up from Ape; The Mac Milan Company,1960; 2nd edition, New York.
5. Peter L. Williams; Gray's Anatomy; 1989; 27th Edition; Pp 80.
6. Lambourne G.; The fingerprint story; Publisher Harrap ltd; London; 1984.
7. Saha K.C.; Dermatoglyphics; J. Indian Med. Associ., 1970; Vol. 54, Pp 428.
8. Schaumann B and Alter M; Dermatoglyphics in Medical disorders; Springer-Verlag; New York; Heidlberg; Berlin; 1976.
9. Kumar S, Mangal BD, Kumar N; Dermatology in Healthy Indian Children- An analysis of Finger Prints, Palm Prints, Axial Triradil and 'atd' angle. Sole and Toe Prints; IndianJournal of Paediatrics; 1974; 41(318):249-256.
10. N Kanematsu et al; Study on Abnormalities in the Appearance of finger and Palm prints in Children With Cleft Lip, Alveolus and Palate; J Maxillofac Surg; 1986 Apr; 14(2):74-82.
11. Achs R. and Harper R.; Dermatoglyphics; Am.J.Obstet.Gynecol.; 1968; Vol.101. Pp 1006-1023.
12. Miller J.R. and Giroux J.; Dermatoglyphics in pediatric practice; J.Pediatr.; 1966; Vol: 69; Pp 302-312.
13. Mulvihill J.J. and Smith D.W.; The genesis of dermatoglyphics (special article); J.Pediatr.; 1969; Vol:75; Pp 579-589.
14. Mavalwala J; The utility of the angle atd in dermatoglyphics; Am. J. Phys. Anthropol.; 1963; Vol- 21; Pp 77-80.
15. M Vashist et al; Axial triradius as a preliminary diagnostic tool in patients of mental retardation ; The Internet Journal of Biological Anthropology; 2009; Volume 4; Number 1.
16. A V Salunkhe, U U Joshi, N R Mudiraj; Study of 'atd' angle in myocardial infarction patients; International Journal of Recent Trends in Science and Technology; May 2017; 23(1): 29-32.
17. Rathva Ashish et al; A study of quantitative analysis of dermatoglyphic in Coronary Artery Disease patients; Indian Journal of Basic and Applied Medical Research; September 2013; Issue-8; Vol-2; Pp 831-840.
18. Manara A et al; Digital and Palmar Dermatoglyphics in Myocardial Infarction; AFMC Bangladesh, December 2011; Vol-7; No-2; P 4-8.
19. Suresh Sharma, Sakshi Mathur; The Study of Dermatoglyphic Analysis in Coronary Artery Disease Patients; International Journal of Research and Review; February 2020; Voume:7; Issue:2; Pages: 456-461.
20. Emily K Brunson et al; Reliability of the ATD Angle in Dermatoglyphic Analysis; Coll Antropol; 2015 Sep; 39 (3): 797-800.
21. S B Gilligan et al; A Family Study of Dermatoglyphic Traits in India: Segregation Analysis of Accessory Palmar Triradii and the Atd Angle; Am J Phys Anthropol; 1987 Sep; 74(1): 117-23.
22. V Annapurna et al; Dermatoglyphic Studies in Rheumatic Heart Disease; Hum Hered; 1978;28(1):72-8.
23. Karthick et al; Dermatoglyphics- A Review; Biomed Pharmacol J ; 2015;8(October Spl.Edition).
24. Murthy S.R.; Research in Psychiatric genetics in India; Indian J. of Psychiatry; 1983; Vol: 25; Pp 14-22.