



**ORIGINAL RESEARCH PAPER**

**Anatomy**

**ROLE OF POROSCOPY IN SEX DETERMINATION – A STUDY OF LATENT FINGER PRINTS OF FIRST YEAR MBBS STUDENTS OF CENTRAL INDIA**

**KEY WORDS:** Poroscopy, sweat gland pores anatomy, latent prints, dermatoglyphic, and forensic medicine.

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**ABSTRACT**

**Background:** Poroscopy is the study of sweat pores which are present as a small openings on the friction ridge skin on the distal end of digits, palms and soles in the hands and feet.

**MATERIALS AND METHODS:** The present study is carried out with a sample size of 400 undergraduates of first year MBBS students of central India of both sexes. Under the age between 18 to 23. Right thumb finger print would be taken with printer's ink (Kores ink) on executive bond paper and the above prints are subjected with chemical (Ninhydrin) and studied under microscope (latent prints). The microscopic findings are recorded and examined carefully. Oval shapes of pores are studied and microscopic images were taken.

**RESULTS:** Highest number of pores are 2-4 in 1 cm ridge in both males and females. we found that as compare to females, males shows highest number of pores range between 2-4 per 1 cm ridge.

**Conclusion:** Study of shapes of poroscopy on thumb impressions is the best method for determination of sex. Poroscopy can also helpful in forensic medicine, anatomy of finger prints, anthropology and forensic sciences.

**INTRODUCTION:**

Finger prints are the imprints left on any substance by the skin over the volar surface of the fingers. They are identified by alternate strips of raised dermal ridges and furrows present in the variety of patterns with minute sweat pores appearing along the surface of the dermal ridges.<sup>1</sup> These ridges can help in identification even when epidermis get eroded by damage due to burns or long term submerged in water.<sup>2</sup> Ridgeology is the examination of two parts of ridges of the friction skin surface i.e. pores and the edges. The study of pores is known as poroscopy.

Edmond Locard a French criminologist in 1912 observed that like the ridges character, pores are permanent, immutable and individual and they are useful in identity of individuals when available ridges do not provide sufficient ridge characteristic. He suggested that the identification could be based on size, shape, relative position and frequency of the appearance of pores. Hence, Edmond locard is considered as a Father of Poroscopy.<sup>3</sup>

Finger print features can be divided in to three categories, level one represent ridge flow pattern and general morphological information, level two features represent the minutiae information such as ridge endings and bifurcations, level three features obtained from the sweat pores and ridges present on the fingerprints.<sup>4,5</sup> In a single fingerprint more than 1400 pores can be found<sup>5</sup> Finger print patterns start to develop between fifth and sixth week of gestation and fully formed by the twenty first week, and the sweat glands start to develop around fourteenth week of gestation and acquire adult morphology by the twenty fourth week. A pore is a opening of a sweat duct which is originated from sweat gland in the subcutaneous layer of the skin.<sup>3</sup> pores are oval, rectangular, squarish, pentagonal, elliptical, triangular rounded and rhomboid and pores may be arranged in groups, in the form of chain, single, double. They lie either in the middle of the ridge or periphery, and the size of the pore will be large size, medium size, small size and the number of pores may be 8-11<sup>6</sup>, and pores may be opened type or closed type. A closed pore is entirely closed by a ridge while an open pore intersects with the valley lying between two ridges.<sup>7</sup> The study of the clear pattern of latent prints (the prints which is not visible to naked eye) was developed by various standard methods using powder dusting methods and chemicals such as ninhydrin.

**MATERIALS AND METHODS:**

The study will be carried out on 400 undergraduates (first year MBBS students) both male and female of central India. This present research performed by making right side thumb finger print. Those who are participating in this research we requested them to wash their hands thoroughly with dettol soap solution and clean with napkin so that remove of any dust particles before taking finger prints, thumb would be covered with ink and then the inked thumb finger shall be rolled from side- to-side on bond papers. The age, sex and name of each individual would be recorded in a separate register along with prints

Prints of right side thumb impressions would be taken with printer's ink (Kores ink) and the above prints are subjected with chemical (Ninhydrin) and studied under microscope (latent prints) on Royal executive bond paper.

The following items and procedure shall be used for taking bilateral thumb finger prints from donors:

- Printer's ink (Kore's ink)
- Chemical – Ninhydrin ( Best method for print on bond paper)
- Royal executive bond paper.
- Binocular compound microscope with light source.

The rubber roller was used to spread the ink on glass. As per suggestion of forensic medicine department.<sup>8</sup>

A dettol soap was used to clean the hands before collecting thumb impressions and after collecting impression to clean the stain. The napkin was used to dry the hands of a person before spreading ink.

**NINHYDRIN METHOD:**

The forensic use of ninhydrin for latent print development was first advocated by Oden and Von Hofsten. This method is based on the mechanism that - amino acids, polypeptides and proteins in the fingerprint residue react with ninhydrin producing Ruhemann's purple. Ninhydrin solution is applied by various techniques like spraying, swabbing or dipping and thereafter, the process is accelerated by using heat at 80° Fahrenheit in 80 % relative humidity.<sup>8</sup>

**MICROSCOPIC STUDY OF RIGHT SIDE THUMB FINGERPRINTS.**

The following sweat pores characteristics were examined

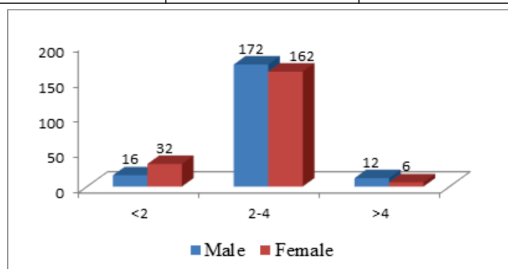
under microscope under 10x magnification.

1. Oval Shapes of the pores in a microscopic field; the oval shape pores which are seen on 1 cm ridge in both males and females.
2. Highest number of oval shapes pores are observed in both sexes and later least number of pores were studied.

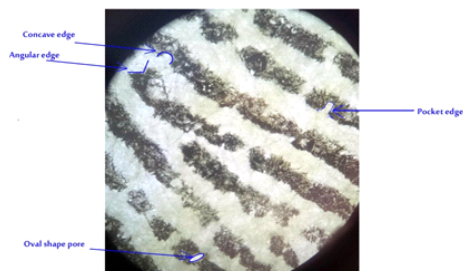
**RESULTS:**

**Table No. 1:- Detail Of Pores Of Right Side Thumb Impression In Males And Females.**

	Male	Female
<2	16	32
2-4	172	162
>4	12	6
TOTAL	200	200



In The above table we observed the oval shape pores present in 1 cm ridge in both male and females. We found the highest number of oval pores are 2-4 in 1 cm ridge .Out of 200 males 172 males shows 2-4 oval shape pore in 1 cm ridge. Which is higher than the females? Out of 200 females 162 females shows 2-4 oval shape pores in 1 cm ridge. Lowest number of pores is less than 2 in 1 cm ridge. We found that out of 200 males 16 males shows less than 2 pores in 1 cm ridge which is lower than females. Out of 200 females 32 females shows less than 2 pores in 1 cm ridge. We also observed that highest number of pores is greater than 4 in 1 cm ridge. Out of 200 males 12 males shows greater than 4 pores in 1 cm ridge which is higher than females. Out of 200 females 6 females shows greater than 4 pores in 1 cm ridge.



**Fig. No 1 Oval Shape Pore On Right Side Thumb Impression Of Female Students.**

**Table No 2:- Comparison between male and female right side thumb impression**

Variable	Male		Female		P VALUE	SIGN.
	Mean	Std. Deviation	Mean	Std. Deviation		
Oval pores	2.43	0.54	2.31	1.05	-0.20	0.85

In the above our results shows that oval pores means is higher than females, and its statically significant (P-0.01)

**Table no 3:- Correlation between male and female student's right side thumb pores (Paired Samples Correlations)**

	N	Correlation	Sig.
Oval & Oval	200	-.056	.431

The above tables shows that correlation between male and female students oval shape pores , we found that paired

sample correlation was -0.56 and it was statically not significant.

**DISSCUSION:**

Finger prints has received its importance in forensic medicine, anatomy, forensic science, and anthropology. Because of its unique nature of an individual's fingerprint which remain unchanged throughout life. Shapes of sweat pores are used for identity of an individual. Study of sweat pores is known as poroscopy.

In the present study we observed that the highest number of oval shaped pores is 2-4 in 1 cm ridge and out of 400 samples 334 samples of both sexes showed the average number of pores is 2-4 in 1cm ridge and average range is 83.5%. According to bindra study poroscopy among 100 individuals observed that oval and rectangular shapes pores are least in number (12 % - 25 %) which is lower than the present study<sup>8</sup>. Mariam tafazoli et al observed that the average number of oval shaped pores in 100 samples according to study of mariam tafazoli approximately 3.85% pores are oval in shape<sup>9</sup>.

**CONCLUSION:**

In this we concluded that the shapes of sweat pores which is known as poroscopy. Study of oval shaped sweat pores on thumb impressions is the best method for determination of sex. Poroscopy can also helpful in forensic medicine, anatomy of finger prints, anthropology and forensic sciences.

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