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Poroscopy: A Method Of Personal Identification Revisited

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ABSTRACT

Poroscopy, a little studied aspect of personal identification has been undertaken in the present work. Rolled and plain finger prints of one hundred individuals along with their palm prints were obtained to study shape, size, position, inter-spacing and number per unit area of pores etc. These findings were compared with the findings obtained from the latent prints of same number of individuals to see the practical feasibility of the poroscopy in personal identification. It is found that though the study of pores due to their microscopic nature is somewhat difficult as compared to the study of ridge characteristics, but the results achieved in the present study indicate that identification with the help of poroscopy is as reliable and accurate as ridge characteristics and can be compared with the results obtained through the study of ridge characteristics.

Keywords: Personal Identification, Dermatoglyphics, Sweat pores, Poroscopy, Latent Fingerprints

Introduction

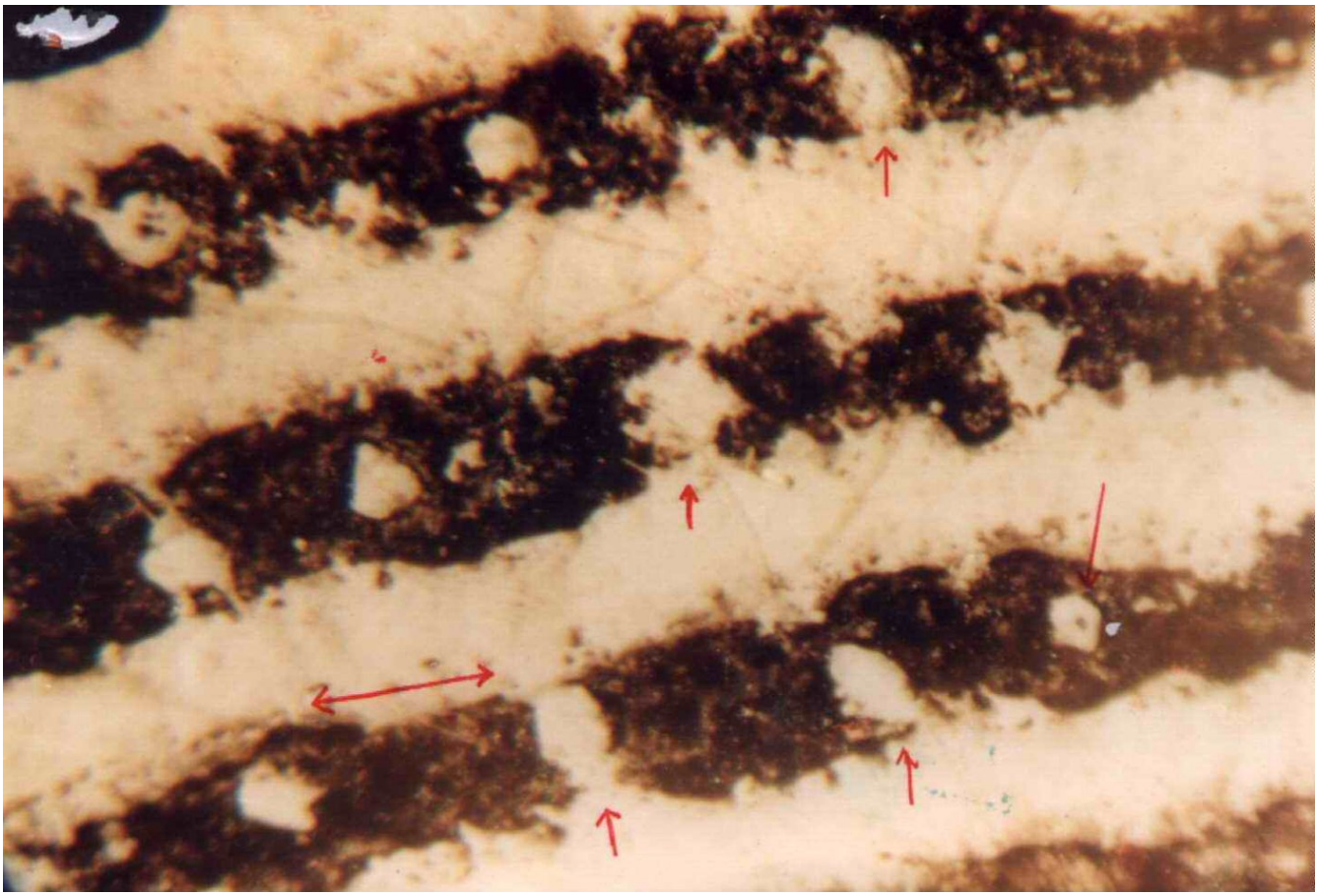

Figure 1: Pores of rhomboid and rectangular shape with open mouth and of distant type

Poroscopy is a method of personal identification through the comparison of the impressions of sweat pores (present on friction ridges of palmar and plantar surfaces). The method was discovered and developed by Edmond Locard in 1912. Locard observed that like the ridge characteristics, the pores are also permanent, immutable and individual, and these are useful to establish the identity or otherwise of individuals when available ridges do not provide sufficient ridge characteristics.



The case of Boudet and Simonin [1] solved by Locard on the basis of the impressions of pores in the latent prints opened a new chapter in the science of identification (please click here for more information on this case), but this technique could not gain much popularity except for a few stray works here and there [2-6] most likely due to the following probable reasons:-

a) Lack of sufficient and systematic data about the various aspects of sweat pores, such as shape, size, position and interspacing frequency etc.

b) The sweat pores may not always appear in latent/inked impressions and their microscopic nature restricts the finger print experts to give proper attention to examine their details and to use them for identification purposes.

Keeping these factors in view in the present work, an intensive study of sweat pores in the inked and latent prints has been carried out. Shape, size, position, interspacing and frequency of pores in different fingerprints of hundred individuals of Palmar surface have been studied and findings are compared with the corresponding latent prints. The effect of various surfaces and developing methods for latent prints have also been studied vis-a-vis any variations in the pores.



Figure 2: Pores making chain type configuration

Material and Methods

The present study is based on inked finger prints and palm prints of one hundred individuals. The plain and rolled inked finger prints of each individual were obtained on white plain paper sheet according to the standard method described by Henry [(3)]. Each individual was requested to place his palm on surfaces like paper, glazed tiles, glass sheet, painted doors and glazed metal surfaces of fridge, oven etc. for latent prints.

These latent prints were developed by various standard methods as powder method, iodine fuming, ninhydrin and silver nitrate method. The following features of pores were studied under a simple microscope with 50x magnification.

1. Number of Pores

Under 50x magnification, average length of a ridge under view was found to be about 0.5 cm. Pores were counted on the ridges at random and average number of pores per centimeter of ridge was calculated.

2. Distance between Pores (Interspacing)

a) Pores with close interspacing : Where pores were lying very close to each other and more than twelve pores were present on 1 cm. ridge length.

b) Pores in groups with close interspacing : The pores lying in the groups of two or more than two number of pores on 1 cm. Ridge length were classified as pores in groups.

c) Pores with distant interspacing: The number of pores present on one centimeter ridge length ranged from 8 to 11 and the space between the pores was comparatively more.

d) Pores with chain like formation : In this type of configuration, the pores were connected with each other making a chain like appearance and there was no interspacing present between the two pores.

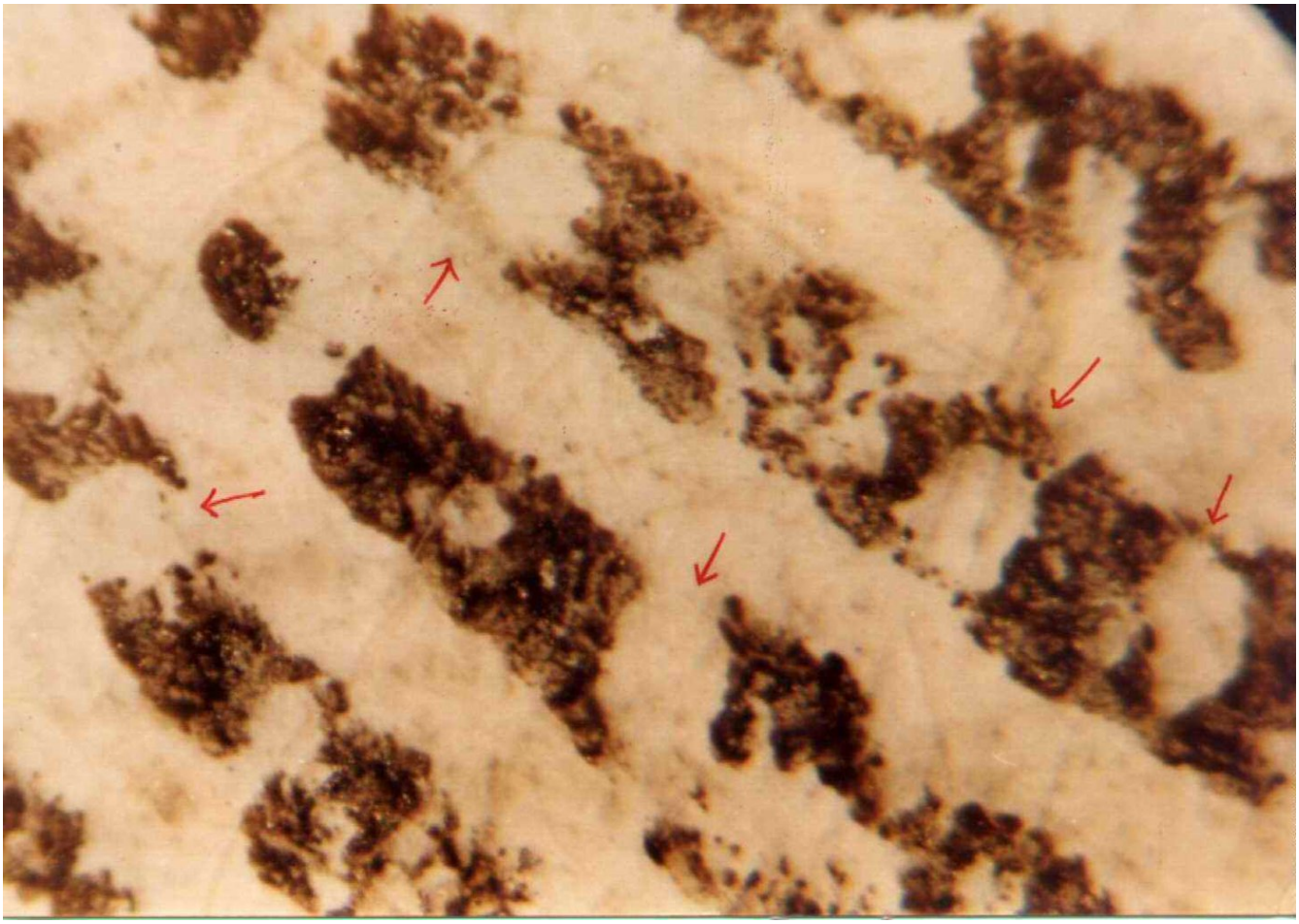

Figure 3: Pores of large size with open mouth

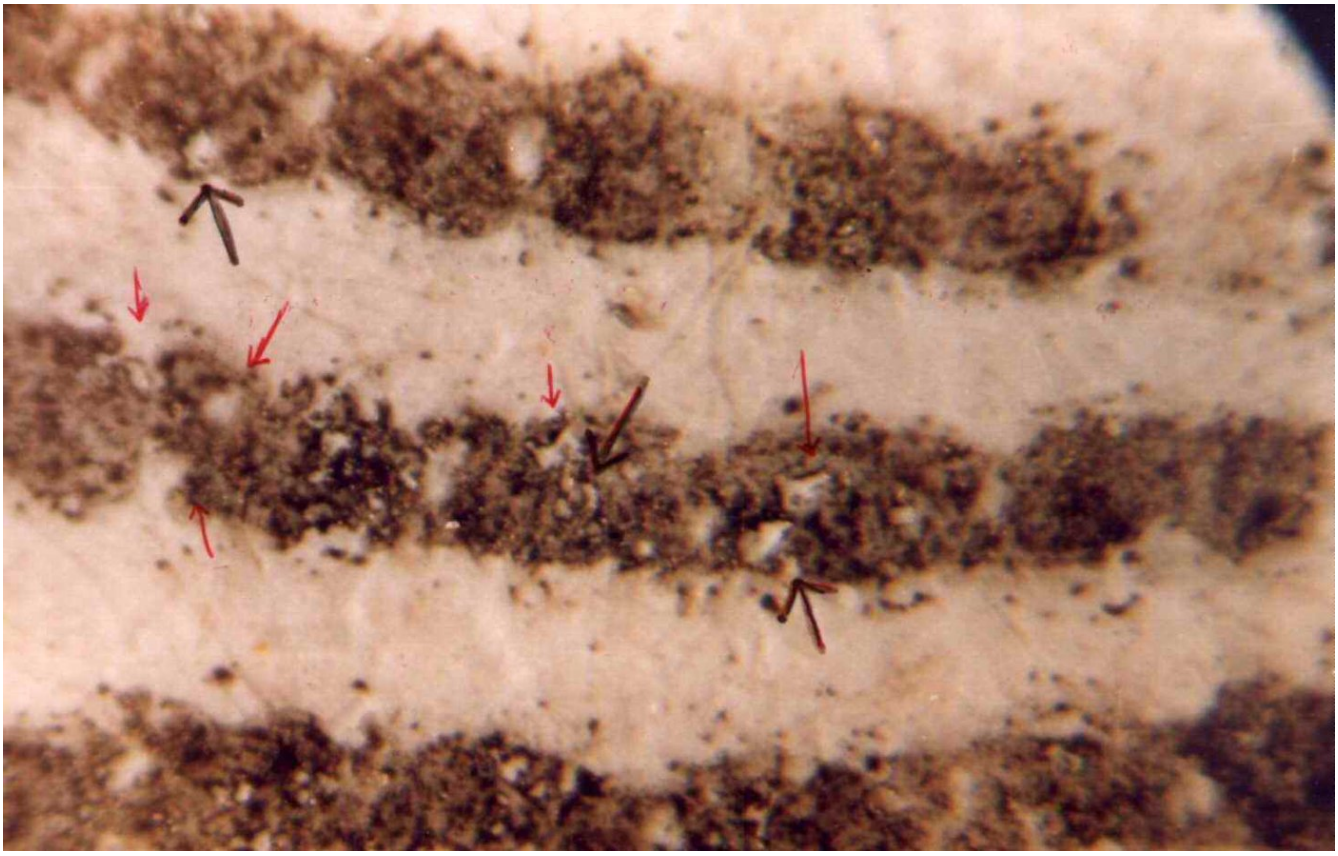

Figure 4: Pores of minute size lying in groups and very close to each other

3. Size of Pores

Size of the pores was determined by comparing the pores with the largest pore in the print and divided as: {a} minute {b} medium and {c} large.

4. Shape of Pores

Pores on the same ridge was found to be of different shape as following: [I] Rounded [ii] Rhomboid [iii] Elliptical [iv] Square [v] Rectangular. In each area, the frequency of all these type of pores was determined by counting the number of pores of a particular shape.

5. Position of the Pores on the ridge

Position of the pores on a ridge was determined by noting whether the pore was situated in the center of the ridge or on the periphery of the ridge. If lying on the periphery, the pore could either be an open type, i.e. with an open mouth towards furrow or just lying on the periphery with closed, well defined boundary, i.e. closed type.

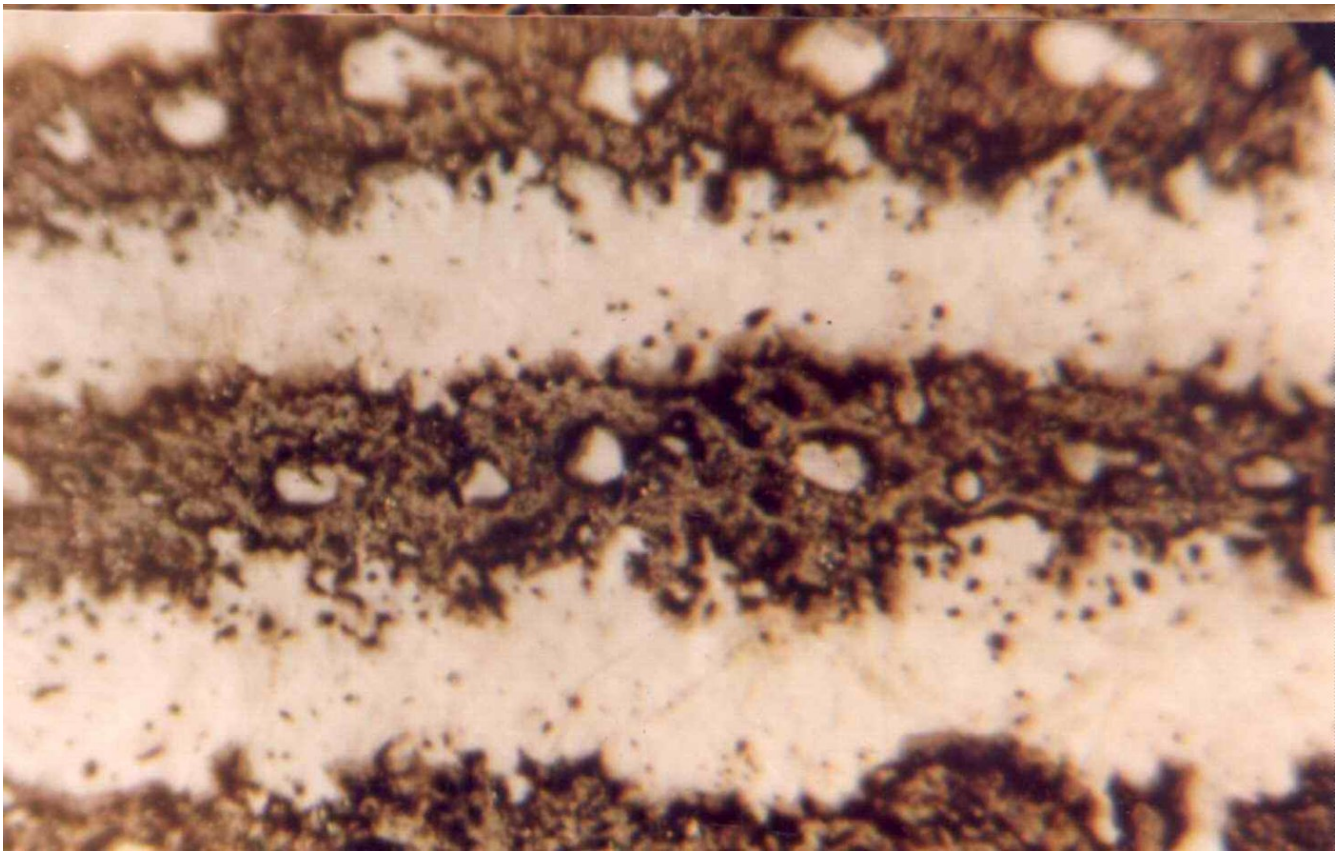

Figure 5: Pores located in the middle of the ridge

One hundred cases were studied by Bindra, Jasuja and Singla, the first two of whom are associated with the Punjabi University, Patiala. They came up with some remarkable results. Even the Great Locard did not study the variation in number of pores in various areas of the ridged surface. Carrying his work further, the three prominent scientists studied the number of pores, per cm, and found this could be utilized as a good means of identification. Many other variables such as interspacing between pores, size and shape of pores, and even the position of pores along the ridges were found useful in identification!

Results and Discussion

(A) Analysis of Inked Prints

(B) Analysis of Latent Prints

Both the findings were compared and results were presented as following:

(A) Analysis of Inked Prints

[1] Number of Pores

It was found that average number of pores present on one centimeter of ridge varied from 8 to 25 confirming the findings of Locard [(1)], but Locard did not study the variation in number of pores in various areas of the ridged surface. In present study, it was observed that maximum number of pores [twenty five pores] were available in lateral side of the hypothenar area and digital pad area while the minimum number of pores were available in thenar area (eight pores). The reason for

such a large variation may be the flattening of ridges due to greater tear and wears with the result of which boundaries of pores also get worn and pore do not appear in the print.

[2] Interspacing between Pores

It was found that most of the pores on a ridge lie one behind the other making a row with almost uniform space, but other type of the arrangements were also observed where pores are lying side by side on the peripheries of a ridge with a very less space in between. though, the earlier type of arrangement has been found more frequent. One rarer type of the arrangement of pores was also observed where pores were interconnected with each other with no interspacing and making a chain like pattern. This arrangement becomes more prominent when connected pores are open and lying on periphery of the ridge. In this case, the ridge itself looks like a cross stitch. Those type of the patterns in the pores when present on the ridges, may prove very helpful in establishing identity.

[3] Size of Pores

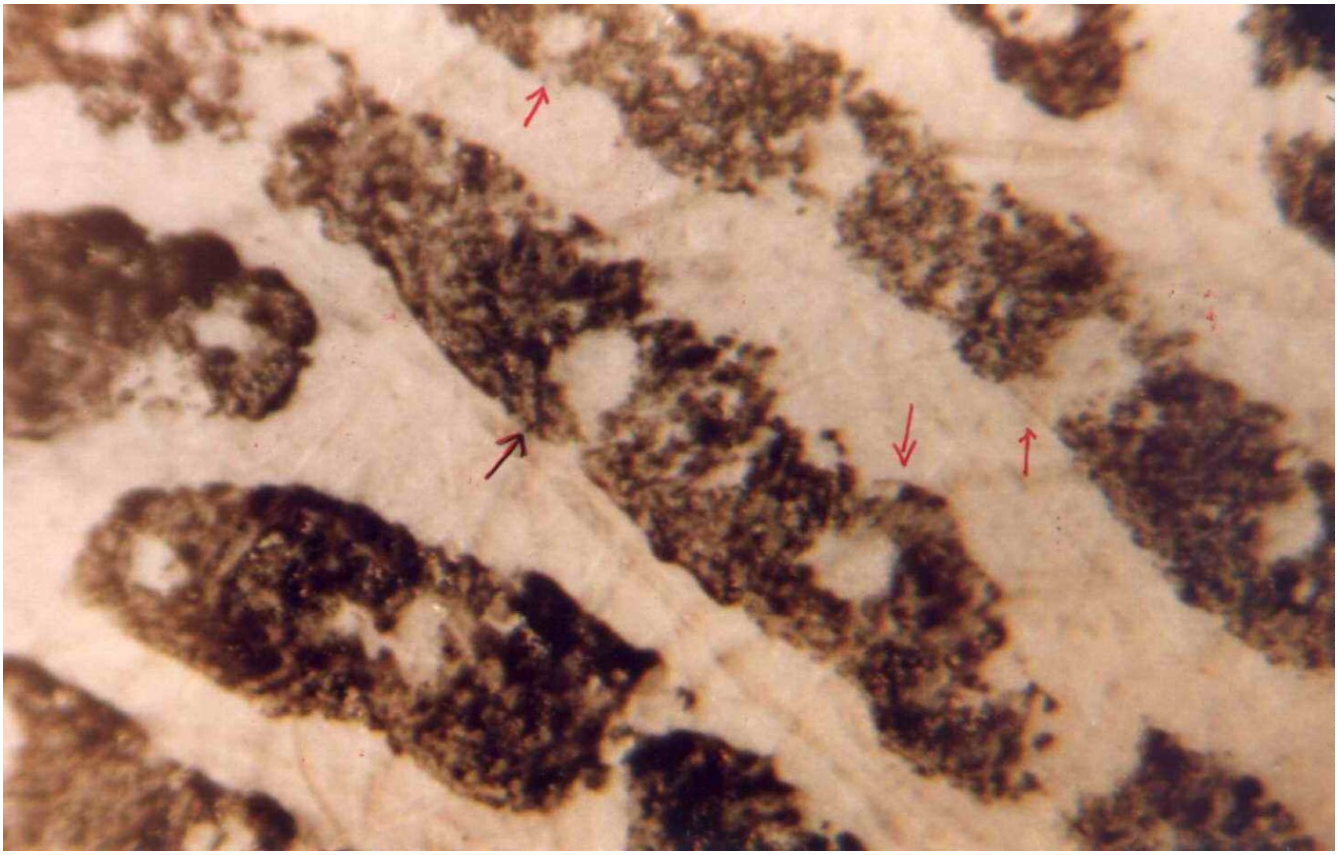

Figure 6: Pores of medium size and rounded in shape

It has been observed that pores of different size may be present on the same ridge. Therefore, instead of measuring each and every pore, comparative study was made of all the pores present in a print. In particular area, the largest pore was noted and all the pores were defined relatively as minute, medium or large. Another reason for adopting this method was a very large variation in the size of pores on the same ridge. It was found that large pores may be lying with one or more minute pores on the same ridge. No systematic arrangement of pores in this regard was found. This feature is very helpful in comparison of pores of two prints, being a fixed characteristics, if sufficient number of pores with different sizes are present on corresponding, identity is

established. In present study, the medium size pores were found most frequently in all the areas of print area (50% to 72%) followed by minute size pores (27% to 31%). The frequency of large size pores was found the least, which were found even absent in interdigital areas in some prints where minute type f pores were found maximum (72%).

[4] Shape of Pores

It was observed that shape of the various pores differed significantly in the same print and on the same ridge. Most frequent type of the shape found in all the areas of a print was rhomboid shape (29% to 39%). This shape of the pores was present maximum in Digital pad area (39%) while in interdigital area, they were minimum (29%). Round shape pores were found to be ranging from 23% to 31%. Elliptical and rectangular shape of pores were also observed, but less frequent (12% to 25% and 15% to 19% respectively). it was observed that pores of a particular shape may be lying together or scattered throughout the print, but scattered pattern was found to be more frequent.

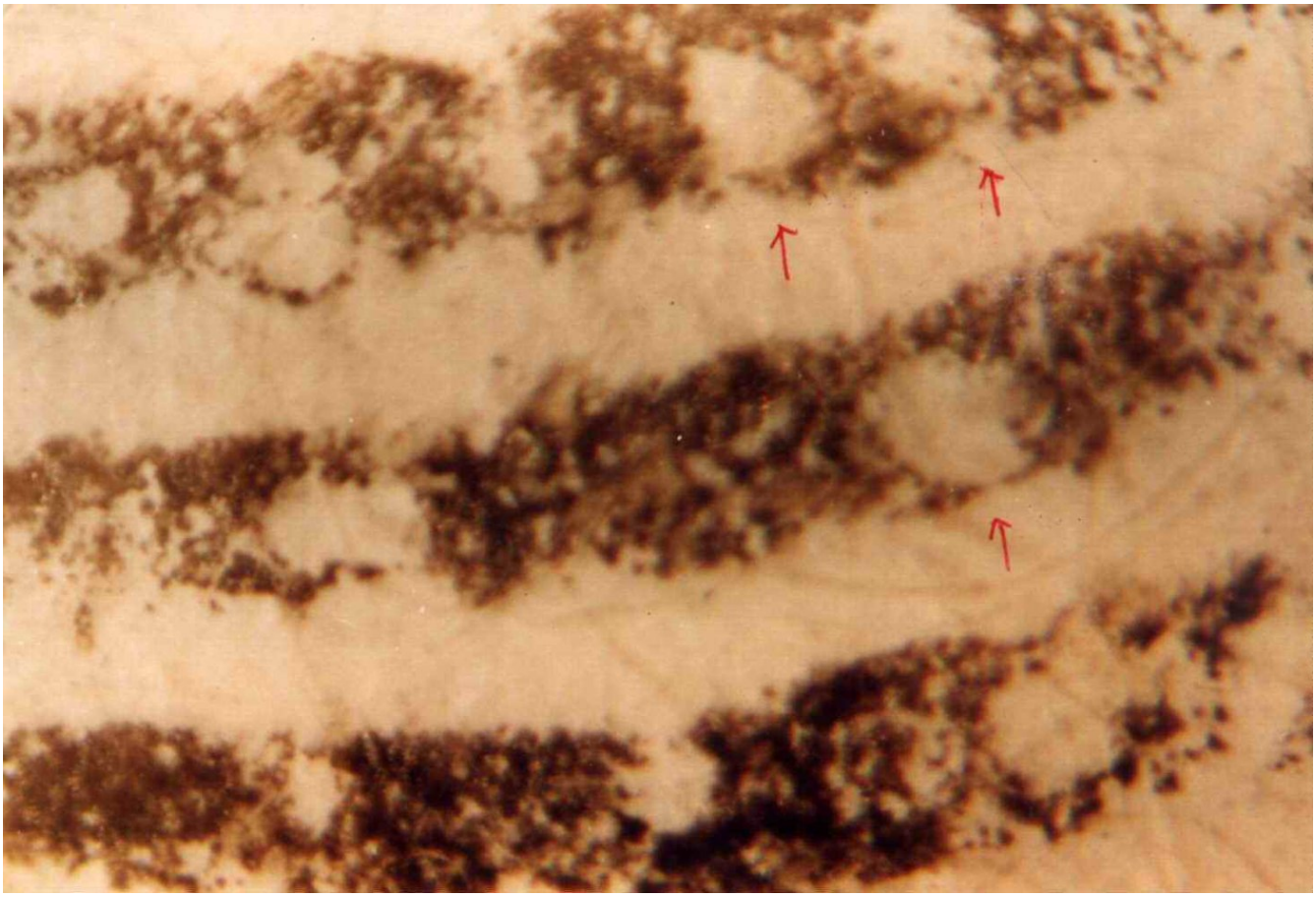

Figure 7: Pores of rhomboid shape

[5] Position of the Pores

The pores on a ridge were lying either in the middle of the ridge or on the periphery of the ridge towards furrows. When lying in the middle of the ridge, the pores are always with a definite boundary. They are called closed pores. While lying on the periphery, they could be closed pores, but in addition to closed types, pores with broken boundary walls towards furrows were also observed. These were called opened pores. In the present study, it has been observed that the overall frequency of pores in middle and periphery of ridge is almost same. But the close type of

pores were found to be more in number as on periphery also majority of the pores were closed type (65% to 80%) except in some cases where pores make chain like formation.

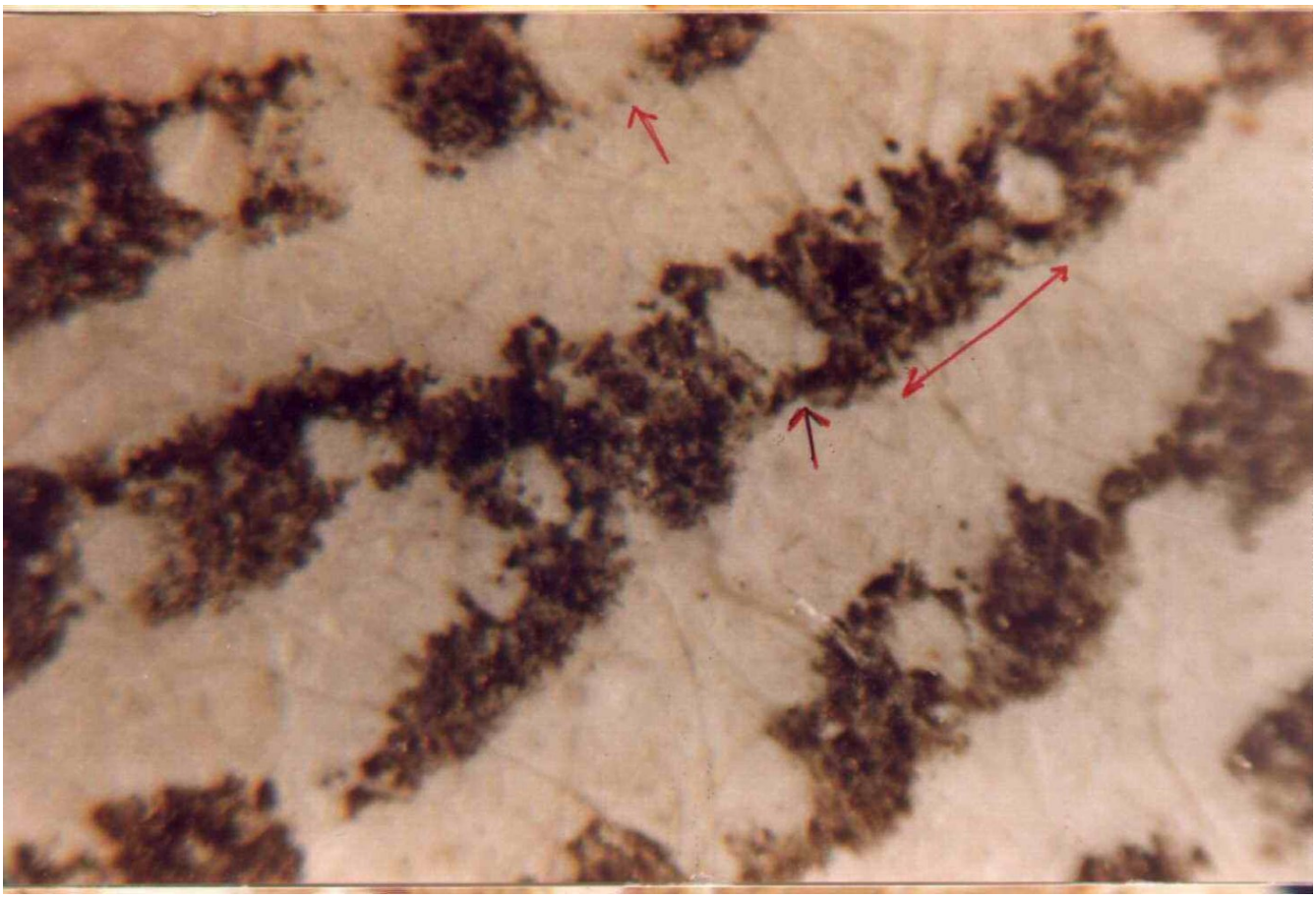

Figure 8: Pores of elliptical shape of distant type. Note the arrow between the two adjacent pores

B. Analysis of Latent Prints

Latent Prints were obtained on porous as well as on non-porous surfaces as paper, glazed tiles, glass sheet, painted surface, metal surfaces, surface of fridge, oven etc. These prints were developed by various powders, [Chalk powder, Black Photostat toner, Magna powder], Iodine fuming, Ninhydrin and Silver Nitrate method. The developed prints were studied for the effectiveness of the method used in terms of visibility of pores to compare the findings with inked impressions for the same features. All the results were presented in three categories as following:-

a] Very clear

Those developed prints or areas of prints where pores were visible and could be studied for all the features of pores as in inked prints.

b] Clear

Where pores were visible and all the features other than shape and size of pores could be studied.

c] Not clear

Where pores were visible only and no feature could be studied.

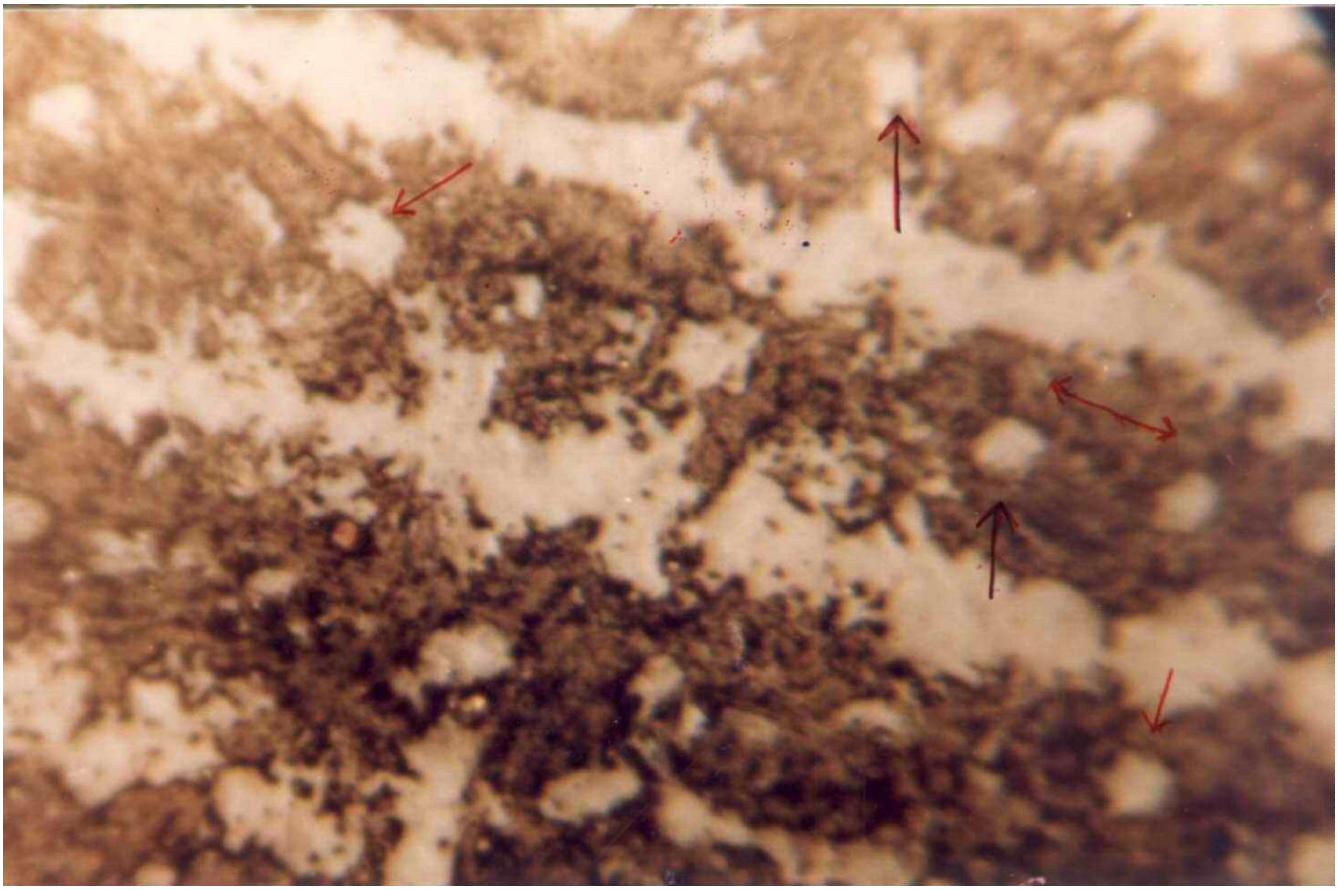

Figure 9: Pores of square shape of distant type

It was observed that Ninhydrin has been found the best method amongst all the methods used for development of latent prints on paper and clarity of the pores with respect to the features studied for inked impressions. The pores were very clear similar to inked prints and every detail was available. But, Ninhydrin could not show the desired results with non-porous surfaces as glass and glazed metal sheets etc. For non-porous surfaces, usually powder method is recommended and preferred, but in the present study, as far as visibility of pores is concerned, not very clear results were obtained. Chalk powder, black Photostat toner and magna powder has been used in present study and Photostat toner was proved to be the best powder for developing pores details. The development of latent prints on glazed metal sheet, mica-sheet, glass plate with Photostat toner was very clear as compared to that on paper. For all type of porous and non-porous glazed surfaces, Iodine fuming method has shown the best results and pores were very clear. In case of prints on paper developed by Iodine fuming, the results were as good as in case of Ninhydrin prints on paper. But the only disadvantage is of temporary nature of the iodine developed prints. One has to photograph those prints immediately under proper magnification for the study of pores. Silver nitrate method was used for developing latent prints on paper only. The pores were visible and clear in all the areas with ridges.

Conclusion

Though the present study is limited to a small sample size, findings obtained thus are very encouraging. In inked prints, there was found no problem in study of pores, but in case of latent prints, the details of pores depend upon the type of surface and method used for developing the

latent prints. Finally, it is concluded that inspite of difficulties in making their study, poroscopy can be of a great help in personal identification, if taken into consideration seriously.

References

1. Wilder H.H. and Wentworth, B. (1923): Personal Identification. The Grahm Press, Boston Pp 291-311
2. Moenssens, A.A. (1975): Fingerprints techniques. Chitton Book Co. Philadelphia, N.Y.
3. Henry, E.R. (1913): Classification and uses of fingerprints.His Majesty's Stationary Office , London
4. Chatterjee, S.K. and Hague, R.V. (1988): Fingerprints or Dactyloscopy and Ridgeoscopy. Srijib Chatterjee,17,Lake Avenue, Calcutta, India.
5. Cummins, H and Midlo,C. (1943): Fingerprints, Palm and Soles- Introduction to dermatoglyphics. The Blackston Company, Philadelphia.
6. Ashbaugh, D.R. (1995): Ridgeology: Modern Evalutive Friction Ridge Identification - Personal Communication.