



## ASSESSMENT OF AGE FROM THE RIDGE DENSITY OF LATENT PALM PRINTS

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### ABSTRACT

*In addition of being highly utilized for identification and substantiation of suspects, latent prints (Finger & Palms) play a essential role and determination of age of an individual can be a crucial facet for intimate identification. Being inimitable by nature, perpetual and identifiable features of an individual, the possibility of identifying to the suspects from such latent prints which are confronted from scene of occurrence or even on documents is higher and conclusive.*

*In the present study, 80 samples including (40 males & 40 females) aging from (15-55) years were taken from the Local jaat residents of Uttar Pradesh, North part of India. By the successful intensification of latent palm prints on documents, the ridge densities were taken from 25 mm<sup>2</sup> area (as per the international standard). As a denouement, the procured mean ridge density in each gender and every age group were different. In this study, we observed that the females have significantly higher ridges than males. It indicates that on the basis of ridge density of latent palm prints, the aging of an individual can be done successfully.*

**KEYWORDS:** latent prints, ridge density, gender, documents.

## INTRODUCTION

In many instances, the identification of the suspects rely on the evidences (Latent prints) encountered from the scene of occurrence (Sumit S & et al., 2013 , Ramanjit K & et al., 2011). In forensic identification & investigation field, the latent prints (Palm and Fingers) have their own significance (Mitra S V & et a., 2013) and utmost importance which carry the suspects to the prosecution level in court of law (Sayed Y & et al., 2013). Such kind of latent prints require careful intensification and examination for the purpose of identification (Wadhwa R et. al., 2013). Identification of individual through palm prints is infallible because of its nature (Uniqueness, permanent and perpetual) (Desai B et. Al., 2013) and palm prints analysis plays a role in convicting the person (Gomale S S & et al., 2013) responsible for an audacious crime (Kaur R & et al., 2012; Microsalav K & et al., 2003). The analysis of latent prints can determine the age and sex of accused correctly among the large number of suspects.

In this paper, the age of an individual from latent palm prints present on documents were considered. It must be remembered that while writing or preparing the works of art, etc. one cannot help touching or holding the surface, a part of the palm resting on the writing surface to give support and facilitating the movement of the hand. Since the Palm/ fingers have raised lines and furrows having sweat pores which keeps the ridges moist, and hence as it touches the writing surface, it is expected to leave their impressions of the lower part of palm (Hypothenar area) in latent form on the writing surface or papers. Being a colorless fluid of the sweat; the prints so left behind are not visible to the naked eye and the visibility of the prints are enhanced.

To estimate the age of suspect from the ridge density of latent palm prints is challenging (Redomoco E G & et al., 2008) and no work has been carried out yet related to this (Idu M., 2013). In this study, an attempt has been done to do aging from the ridge density of such latent palm prints from the documents in  $25 \text{ mm}^2$  (Sudesh G., 2007; Singh G., 2012). It was found that the ridges density of latent palm prints of males and females have a significant difference according to their age and females have more far ridges in  $25 \text{ mm}^2$  in comparison of the male. A conclusive identification of aging from ridge density of latent palm prints was done which will be helping for forensic experts and Investigators for nabbing the suspects (Dennis E., 2012). Age information is important to provide leads for investigative an unknown person among a large number of suspects (Agnihotri A K., 2012).

## **EXPERIMENTAL**

### **A. Materials and Methods**

For the present study, all the 80 samples including (40 males and 40 females) were selected from the population of Uttar Pradesh, North part of India. All the samples were taken randomly. All the individuals were asked to write something on a white paper A4 size sheet with their consent. According to the mutual exchange principle, the latent prints were transferred on the white sheet. For developing the latent prints, traditional and easily available method Black Powder was used, which is usually considered best developer for fresh latent prints on documents.

### **B. Processing**

For sampling, the primary information about the subject whether they can put their sign on papers was confirmed. After giving a blank white paper sheet and blue ball pen to the subjects were asked to sit at ease, and to put their signatures. All the individuals were spoken to put their signatures on the sheet at calm and congenial atmosphere. The prints in latent form were also transferred on papers and below to the signature. By carefully handling, the sheets were put in clean white paper envelope at room temperature, so that the dust and other contaminants present in atmosphere couldn't affect the sheets. When the latent prints were treated with black powder, the developed prints shown in figure were clear and having enough information about the ridge details and identification of an individual.

## **RESULTS AND DISCUSSION**

In forensics to determine the age of suspects from the latent palm prints encountered at crime scene is very pressing and yet so far unsolved challenge. The purpose of the study was to establish estimation the relationship of age of suspects from the latent palm prints present on documents. The latent prints may be affected by other factors such as subject's health, sex, diet, metabolism and occupation, when these latent prints are transferred on a surface; it depends upon the surface texture, physio- chemical structure and the intensification process of the prints.



Fig-1; Intensified latent palm prints on documents.

It was noticed from the developed palm print present on documents, that when an individual writes on a paper; he/ she always left their identity in form of latent. These prints are needed to be treated with different battery of intensification. Appropriate method with respect of time plays an important role for development of the impression, identification and nabbing the suspects. Conventional application of developing methods can decrease the possibility of less damage. In these study only trendy methods (Black powder) was used to determine the age of an individual from the ridge density of latent palm prints.

<b>Samples</b>	<b>Age Group</b>	<b>% in male</b>	<b>Male Ridges</b>	<b>% in female</b>	<b>Female Ridges</b>
20	15-25	90%	10	95%	11
20	26-35	95%	11	90%	13
20	36-45	85%	13	90%	15
20	46-55	90%	12	80%	13
Total=80					

Table1; Ridge density of male and female according to different age group

It was noticed for the study the female has greater ridge density then male. In 25mm<sup>2</sup> area (Shown in figure-2)



Figure 4.4.2.; ridge count in area of 25 mm<sup>2</sup> of intensified palm print present on documents.

It was found the male have thicker ridges while female have thinner ridges which increases the number of count per ridges. In some cases, if the female is mostly busy with watery work then tearing of ridges can be encountered and ridge count in an area can be increase (mostly the Palmar area), while the male who works in fields or a laborer; the ridges are found thicker. In this study, after studying all samples it was observed that; in age group (15-25) years the 90% of male has  $\leq 10$  ridges/25mm<sup>2</sup> while 95% of female have  $\leq 11$  ridges/25 mm<sup>2</sup>. In age group (26-35) years, 95% male have  $\leq 11$  ridges/25 mm<sup>2</sup> while 90 female have  $\leq 13$  ridges/25 mm<sup>2</sup>. In age group (36-45) years, 85% male have  $\leq 13$  ridges/25mm<sup>2</sup> while the 90% female have  $\leq 15$  ridges/25mm<sup>2</sup>. And in age group (46-55) years, the 90% male have  $\leq 12$  ridges/25mm<sup>2</sup> while 80% female have  $\leq 13$  ridges/25mm<sup>2</sup>. From the obtained results of both gender (Male & female) If the ridges counts comes  $\leq 11$  ridges/ 25 mm<sup>2</sup> then the gender of the suspect is likely to be Male origin and if the  $13 \geq$  ridges/25 mm<sup>2</sup> or more then that is likely to be from female origin. The comparative graph of the ridge density according to the age group between both genders (male & female) has shown in figure-3.

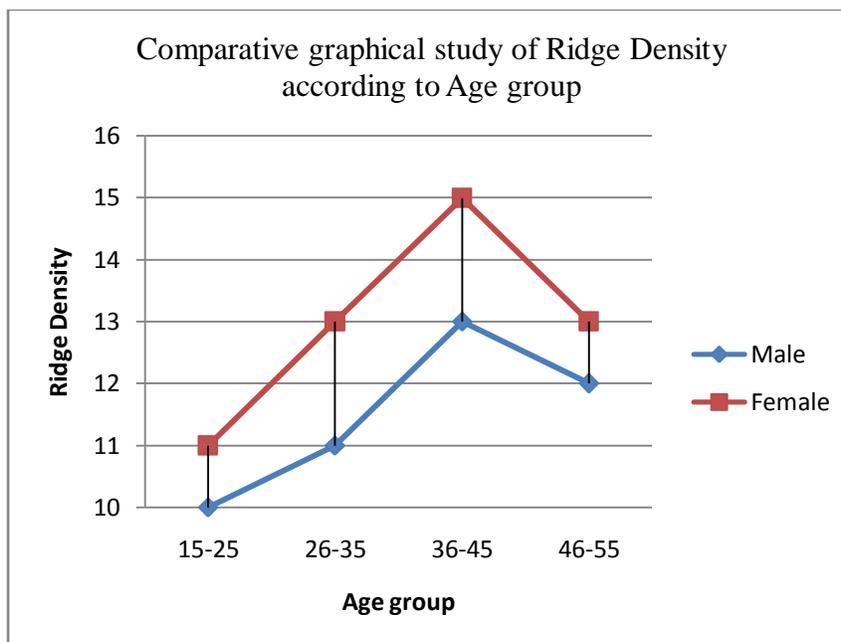


Fig.3; Comparative graphical study of Ridge density over distributed age group among male and female.

Many studies have been concluded on the ridge density count from the fingerprints, but no work has been carried out yet on the intensified palm prints. The results of the present study are encouraging and will be helpful tools for the law enforcement agencies and investigators in field of forensic science and in social life also. Once the age and sex of the suspect will come to know from the latent palm prints or part then after taking specimen of the suspects; it would be easier for investigator to identify an individual (A methodology of finger mark research).

## CONCLUSIONS

Palm prints, which provides personal identification are extremely and more reliable, infallible by the nature of its uniqueness and often encountered on the scene of occurrence (Chardnabi E S, 2014). These prints, which are far away from the knowledge of the experts, can provide the identity of suspect's age and sex (Sajjad N K. & et al., 2014). This study was carried out to estimate the age through intensified latent palm prints of north Indian population and observed that latent palm prints provides a lot of information about the age, sex and nature of the suspects.

This study concluded that in comparison of male and female, female has greater density in a 25mm<sup>2</sup> in the population of North India. Each gender according to their age group represents a significant difference in the count of epidermis ridges. It can be a milestone to accept evidences in court of law and to establish their relationship with the gender of suspect. Once the sexing could be done, then it's become easier for the investigator nab the suspect.

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