Palm Prints:

CAPTURE, SUBMISSION, AND VALIDATION FOR THE NATIONAL PALM PRINT SYSTEM (NPPS)

Introduction

The FBI deployed the NPPS in May 2013 as part of the Next Generation Identification (NGI) System. The NPPS facilitates the storage and search of both known and unknown palm prints, enabling users to compare latent palm prints against this centralized national repository.

An estimated 30 percent of latent prints left at crime scenes are palm images. One of the benefits of a palm print database is that law enforcement has a centralized repository to search.

The palm print submission is a Type-15 record and is used to exchange palm print image data.

The *Electronic Biometric Transmission Specification* (EBTS), Appendix P contains best practices and technical specifications required.

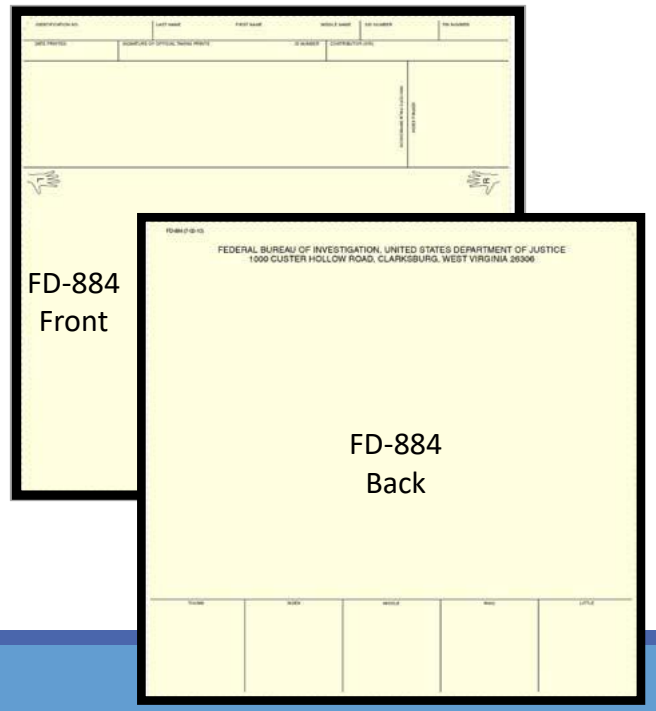
Objectives

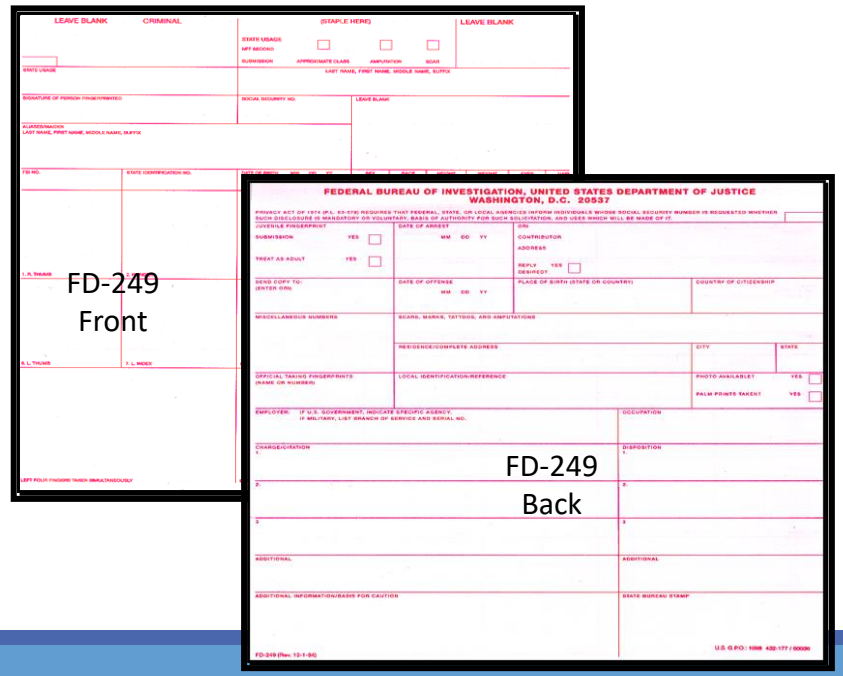
- Define the different palm print image sets.
- Explain the parts of the palm.
- Discuss capturing palm prints for the NPPS.
- List tips and techniques used to assist with better palm print image capture.
- Discuss best practices for submitting palm prints and the different types of images to be captured.
- Discuss palm print verification for identifying related palm print and fingerprint images.
- Discuss validating palm print images submitted to the NPPS.

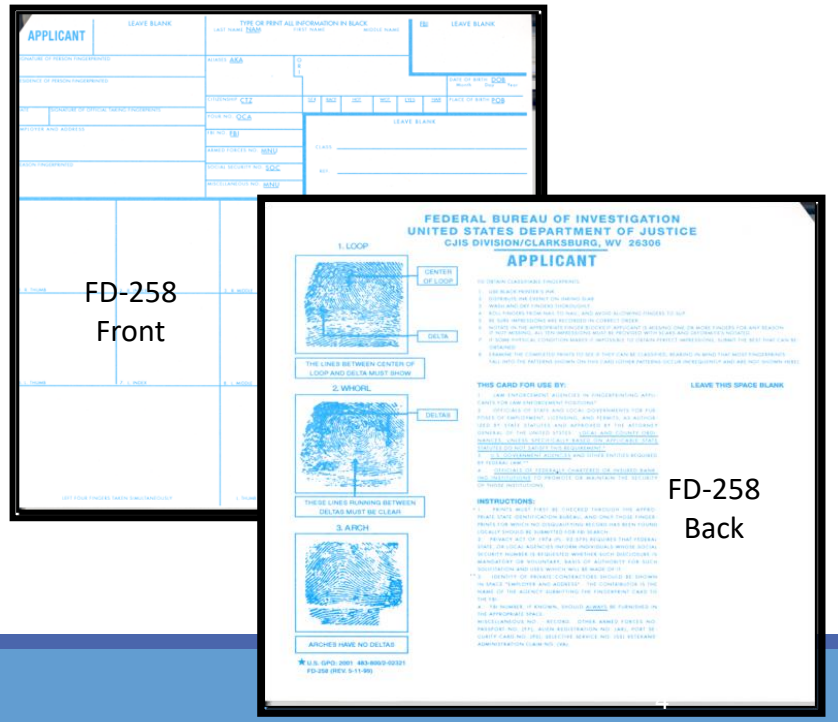
Defining Palm Print Image Sets - Tenprint

Tenprint submissions may include palm print images. When submitting to the FBI, best practices for this collection of prints are defined as one FBI Standard Fingerprint Card FD-249 or FD-258 and two FBI Standard Palm Print Cards FD-884 per subject.

The FBI CJIS Division no longer routinely accepts hard-copy biometric submissions; the standard card equivalents are noted here for users that continue to use the FBI standard cards to support capture/scanning within their individual programs.



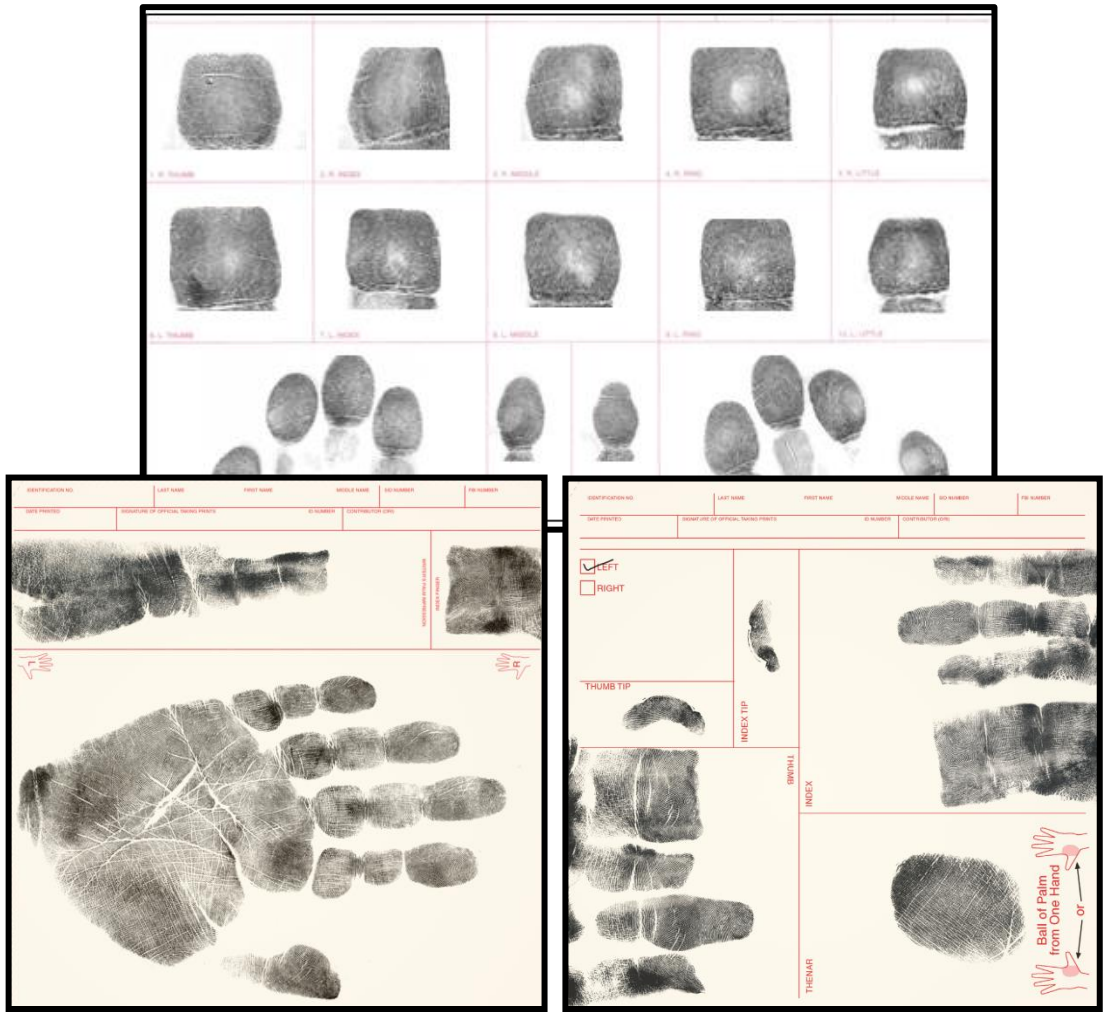




Defining Palm Print Image Sets – Palms

Complete Friction Ridge Exemplars also known as (aka) Major Case Prints are used for major criminal cases and consist of the following components:

- One fully rolled criminal tenprint card (FD-249)(top card)
- Two fully rolled impressions including the sides, tips, and lower joints of each finger (FD-884a) (one card per left and right hand). These cards and images are known as **supplemental images**. (bottom right card)
- Two fully rolled sets of palms including extreme sides (FD-884*) (one card per left and right hand). This FD-884* card includes the fully rolled palm print image and a writer's palm image. (bottom left card)
- There will be five cards for this palm print image set. Images must be printed tip up toward block labels to be correct.



*This file card is used in conjunction with the FD-249 and FD-884a forms.

Complete Friction Ridge Exemplars aka Major Case Prints

Palm prints can be a part of Complete Friction Ridge Exemplars aka Major Case Prints.

- Complete Friction Ridge Exemplars are utilized to make accurate and conclusive comparisons with all latent prints obtained during a criminal investigation – usually a major case.
- Recording all friction ridge detail present on the palmar surfaces of the hand and fingers.
  - What are friction ridges?
    - A raised portion of the epidermis on the palmar or plantar skin, consisting of one or more connected ridge units of friction ridge skin.

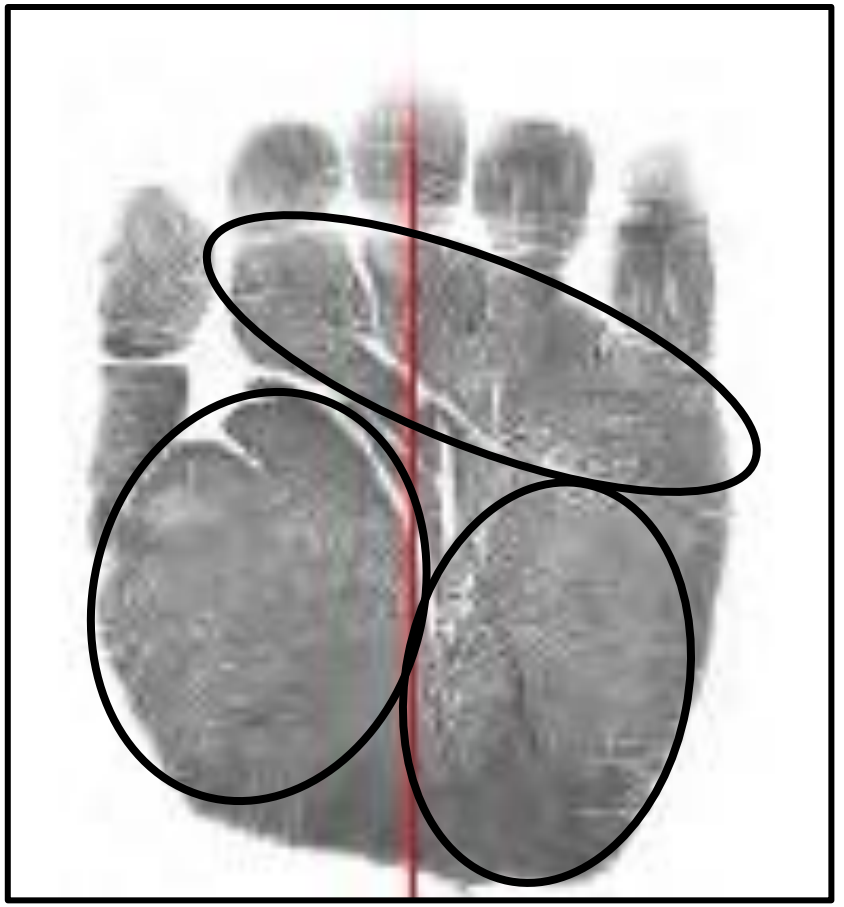
Defining a Full Palm Impression

A full palm is defined as that area extending from the top of the wrist bracelet to the tips of the fingers and can be represented as one or two scanned images.

Defining the Lower Palm Image

If two images are used to represent the full palm:

- The ***lower image*** extends from the top of the wrist bracelet to the top of the ***interdigital*** area (proximal finger joint) and includes the ***thenar*** and ***hypothenar*** areas of the palm.



Defining the Upper Palm Image

If two images are used to represent the full palm:

- The ***upper image*** extends from the bottom of the ***interdigital*** area up to the tips of the fingers (***distals***).

Tips and Techniques for Best Capture

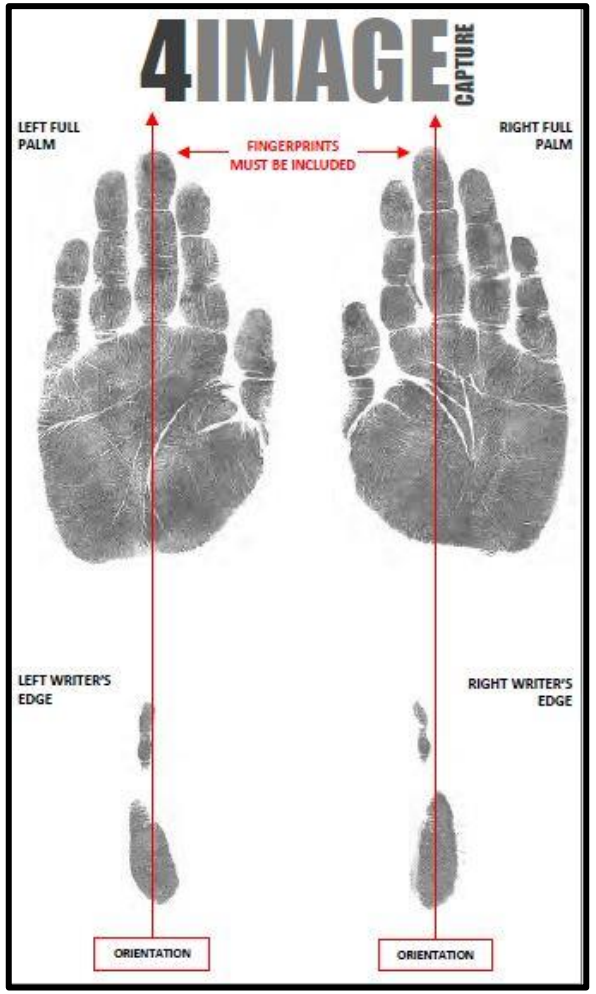
Use cleaners, lotions, and other ridge enhancers to capture the highest quality ridge detail.

- Some prints contain very fine friction ridge detail. There are some commercial products available to enhance the ridge detail, such as ridge builders.
- Wipe moist/sweaty hands with rubbing alcohol or alcohol-based hand cleaner.
- A softening agent (such as hand lotion) may be helpful for hands with dry or flaky skin, use a small amount of hand lotion and wipe off any residue.
- Use less pressure to ensure the best possible capture of prints.

Submitting 4-Image Palm Prints

Best Practice for submitting palm prints include either a 4-Image or 6-Image Type-15 Capture:

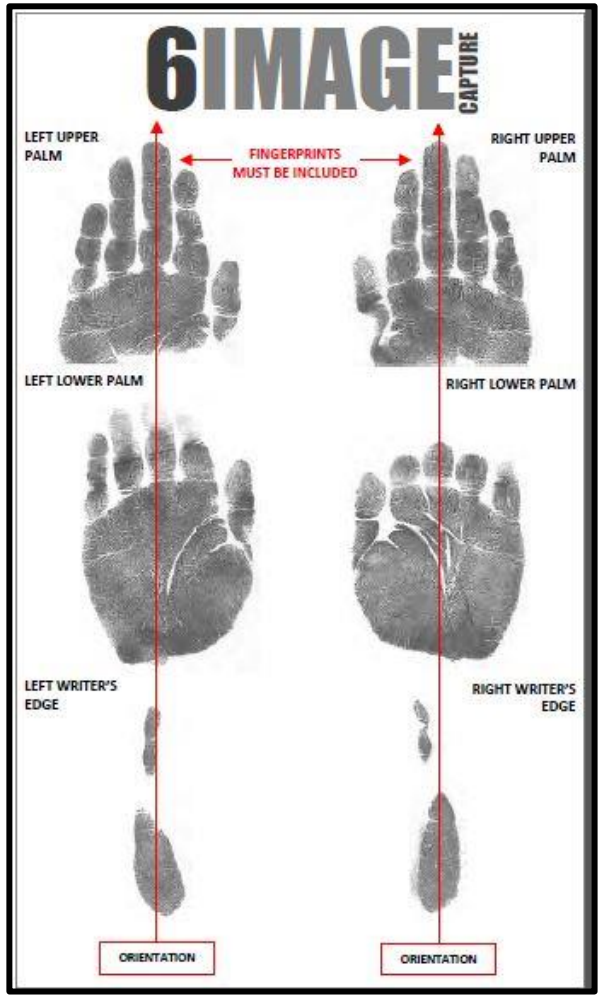
- A 4-Image Type-15 Capture includes a left and right full palm print with corresponding left and right writer's palm print, also known as a "writer's edge", for a total of ***four*** Type-15 Records.



Submitting 6-Image Palm Prints

Best Practice for submitting palm prints include either a 4-Image or 6-Image Type-15 Capture:

- A 6-Image Type-15 Capture includes an upper and lower palm print from each hand with the corresponding left and right writer's palm print, for a total of ***six*** Type-15 Records.



Verification Using the Interdigital

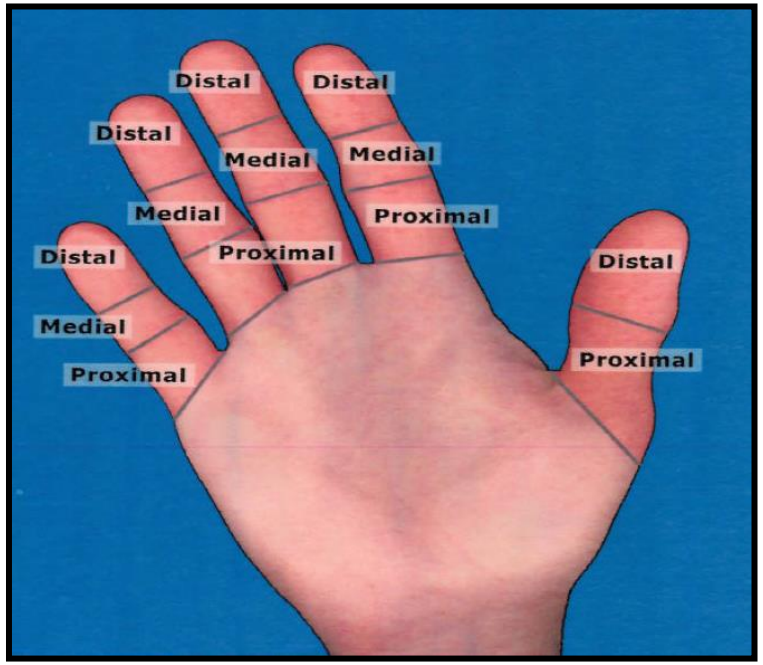
If capturing upper and lower palm print images, an **overlap of the interdigital area on both the upper and lower palm prints** provide an adequate amount of overlap between the two images to facilitate subject verification and enable an examiner to confidently state both images came from the same palm, therefore validating the images for submission to the NPPS.

Upper Palm Image

Lower Palm Image

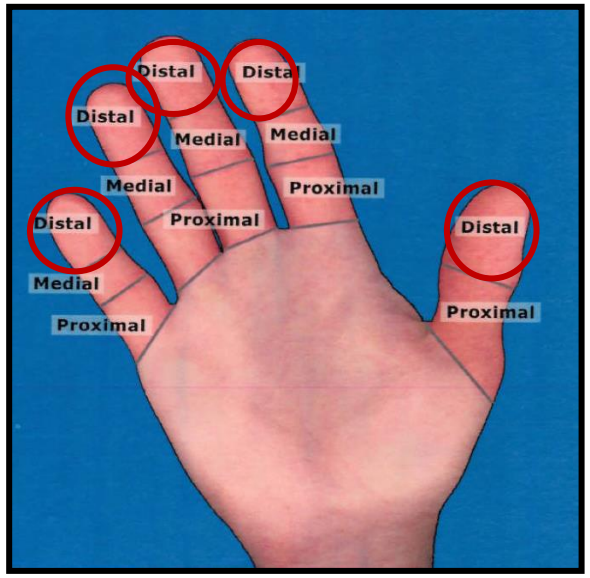
Verification Using the Distals

The inclusion of fingerprint impressions, particularly the distal segments (fingertips), allow the palm print to be verified against a tenprint record for confirmation of identity, which validates the distal palm image for submission to the NPPS. Validation requires one finger, randomly picked, from each hand be verified.



Verification to Validation of Palm Prints

Overlap of **the interdigital area on both the upper and lower palm prints and distal palm print images to tenprint fingerprint images** provide verification the images belong to the same source. Verifying these images belong to the same source, validates the palm print submissions, which permits them to be submitted to the NPPS for search and comparison.



Verification of Palm Print Images

The practice of **“stitching”** together images not captured simultaneously is **prohibited**. Users should **never stitch** together upper and lower palm images to submit as full palm impressions, **this affects the matching accuracy**.

Individual images captured should be transmitted with the proper position code by the contributor: position codes 25 and 26 for the right hand or 27 and 28 for the left hand.

Palm Print Position Codes

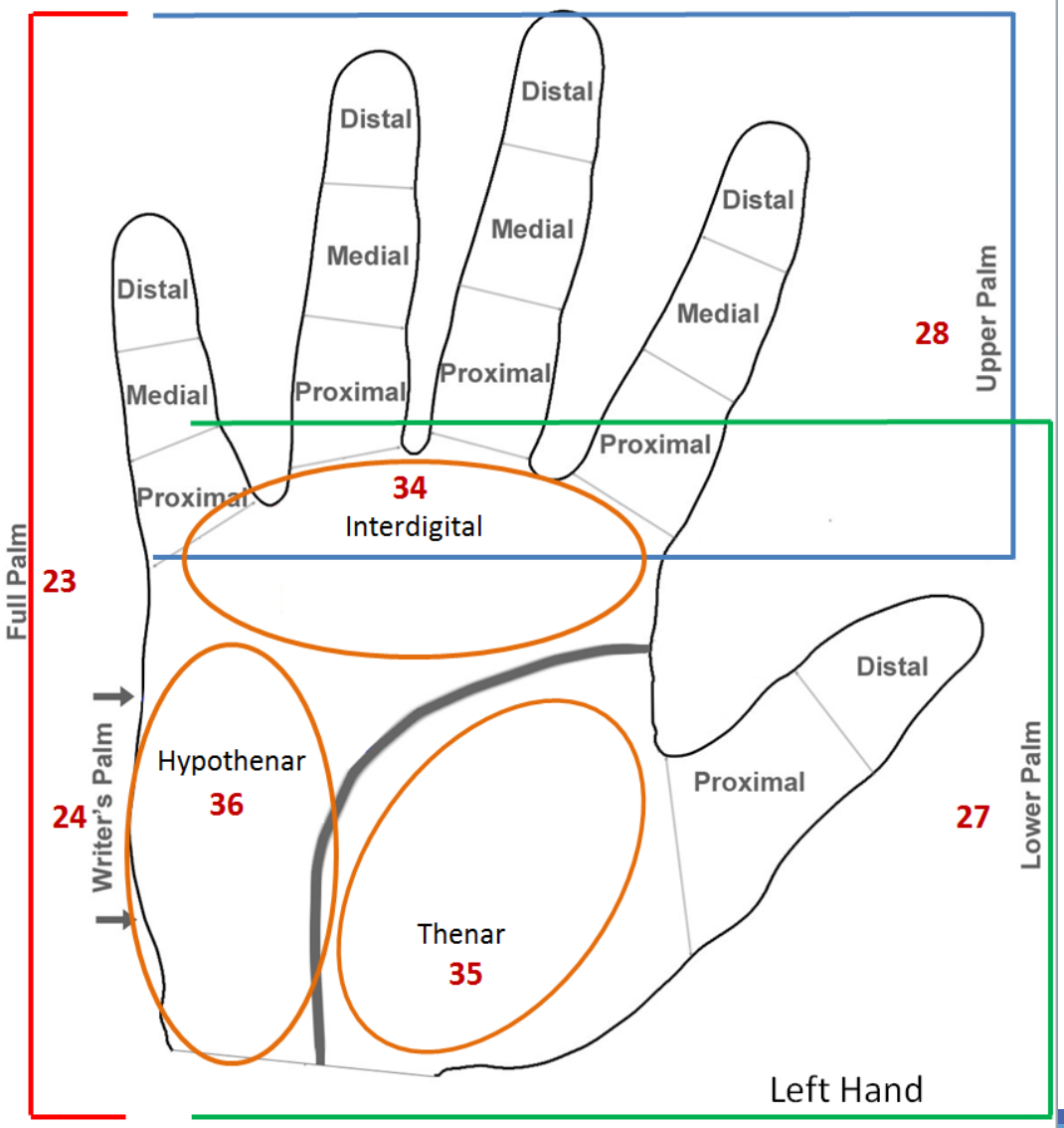
Proper position codes for palm prints should be used.

Right hand:
Position codes 25 and 26

Left hand:
Position codes 27 and 28

Friction Ridge Generalized Position Codes	
Position/Portion	**Code**
Unknown Palm, Searching 21 - 38	20
Right Full Palm	21
Right Writer's Palm	22
Left Full Palm	23
Left Writer's Palm	24
Right Lower Palm	25
Right Upper Palm	26
Left Lower Palm	27
Left Upper Palm	28
Right Other (Unknown Right hand) Searching Right hands between 21 – 38	29
Left Other (Unknown Left hand) Searching Left hands between 21 - 38	30
Right Interdigital	31
Right Thenar	32
Right Hypothenar	33
Left Interdigital	34
Left Thenar	35
Left Hypothenar	36
Right Grasp	37
Left Grasp	38
Right Carpal Delta Area	81
Left Carpal Delta Area	82
Right full palm, including writer's palm	83
Left full palm, including writer's palm	84
Right index/middle	40
Right middle/ring	41
Right ring/little	42
Left index/middle	43
Left middle/ring	44
Left ring/little	45
Right index/Left index	46
Right index/middle/ring	47
Right middle/ring/little	48
Left index/middle/ring	49
Left middle/ring/little	50

Shaded rows are considered 'Future Capability', if selected, will return an error.



Statistics for the NPPS

As of June 30, 2023, the NPPS has:

- 27.9 million individual palm print Universal Control Numbers (UCNs).
- 61 million palm print events.
- 49 states, two territories (Guam and Puerto Rico), and Washington, D.C., contribute known palm prints to the NPPS.
- An average of 13,500 new palm records added daily.
- An average enrollment rate of 88%.

Conclusion

We defined the different palm print image sets and the parts of the palm. We explained the possible ways to capture palm prints and some tips and techniques for better quality image capture. We provided the best practices for submitting palm prints to the NPPS. We explained how capturing an overlap in palm print captures, for example, capturing the interdigital on both the upper palm print and the lower palm print capture, allows for the verification of both captured parts to be identified as palm print captures from the same source. This identification allows us to validate the images for submission to the NPPS.

Please direct questions about palm prints to the Palm Services and Analysis Team (PSAT) at palm_prints@fbi.gov.

References

- Scientific Basics of Palm Prints – Recording – Biometric Training Team (BTT) Presentation, U.S. Department of Justice (USDOJ), Federal Bureau of Investigation (FBI), Criminal Justice Information Services (CJIS) Division
- Scientific Basics of Fingerprints – Recording – BTT Presentation, USDOJ, FBI, CJIS Division
- Palm Print Capture Poster v. 2.0 – USDOJ, FBI, CJIS Division
- Palm Guidance v.3.0 LFSU Handout - USDOJ, FBI, CJIS Division
- The FBI National Palm Print System (NPPS) An Effective and Reliable Law Enforcement Resource - Brochure – USDOJ, FBI, CJIS Division
- Gary Williams, “What Police Officers Need to Know About Palm Prints,” Police Chief online, December 9, 2020.