

# **BARE FOOTPRINTS FOR FORENSIC OFFICERS**

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# Terminology

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**Bare Footprints** – Impressions of the bottom (plantar) surface of the foot. The quality of these impressions will range depending on the detail that's been transferred to the surface and whether friction ridges are visible. For example, a socked foot saturated in blood will leave bare footprints as will the same foot when the sock is removed although friction ridges may or may not be present in the latter. Bare footprints can also include the long-term impression made in a piece of footwear which shows the weight bearing areas of the bare foot. (See foot morphology)

Terminology used in Canadian court cases:

- Footprint, barefoot impression, barefoot prints (Hawkins)
- Bare feet (Cliff)
- Footprint impression (Dimitrov)
- Footprint imprint (Ferguson)
- Heel print (Legebokoff)
- Foot impressions (Newman)
- Footprint (friction ridge) impressions (Rothgordt)

**Foot Morphology** - Forensic barefoot morphology involves the comparison of the weight-bearing areas of the bottom of a bare foot, when ridge detail is not present, in order to establish a link between the bare foot of an individual and an impression found at a crime scene.

Terminology used in Canadian court cases:

- foot morphology (Cliff),
- foot impressions (Cliff),
- footprints (Cliff),
- barefoot impression (Dimitrov),
- footprint evidence (Legere).

**Known Barefoot Impressions** – Friction ridge impressions which have been collected from an individual's plantar (underside) surface of the foot under controlled circumstances. This can be done by (1) applying ink to the bottom of the foot and having the individual walk across a clean roll of paper or (2) applying black powder to the

bottom of the foot and having the individual place their foot on the sticky side of a large sheet of label paper or (3) by taking photographs of the plantar friction ridges.

Terminology used in Canadian court cases:

- known impressions (Cliff),
- known foot impressions (Newman),
- bare footprints (Nielsen and Stolar)

**Footwear Impressions** – Impressions of the bottom of an individual's footwear.

Footwear impressions are typically made (1) when a substance (mud, dirt, blood, etc.) is transferred from the footwear to a surface or (2) when the footwear leaves a 3D impression in a substance such as mud or snow.

Terminology used in Canadian court cases:

- footprints (Howard and Trudel)
- footprint impression (Hall)
- footwear impression (Hawkins)
- foot imprints (Legere)
- shoe impressions (Newman)

**\* NOTE – The collection of terms outlined above demonstrates that Canadian courts have heard a variety of overlapping expressions to describe different aspects of footprint evidence. For example, the term 'footprint' has been used for three of the four above mentioned expressions. Therefore it is important to accurately choose the appropriate terminology to describe the evidence for your case and instruct the court on its precise meaning.**

# Canadian Court Cases - Footprints

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*What follows is a list of the cases in Canada where bare footprint evidence has been admitted. A short summary is provided for each case followed by the areas of the written decision that apply to the foot print evidence.*

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## **R v. Hawkins**

### Summary of applicable information

*The victim, Sheldon Boutilier was found brutally murdered in his Sydney, Nova Scotia home on July 9, 2006. Bloody footprints were located throughout the house and on the victim's body. The following statements are from the initial trial sentencing and appeal decision.*

### **Initial trial sentencing - Citation: R v. Hawkins, 2009 NSSC 410**

[20] The presence of the footprint on Mr. Boutilier's torso is disturbing

[23] I am satisfied that the barefoot and the footwear impressions found throughout the house were made by the same person.

[27] ... We have foot prints which were analysed by an examiner out in British Columbia and a footprint examined here locally, and they both came to the same conclusion; they are Mr. Hawkins' footprints.

[28] ... I have no doubt, Mr. Hawkins, but that you and you alone committed this horrendous act.

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### **Appeal Decision - Citation: R. v. Hawkins, 2011 NSCA 6**

3. Forensic evidence showed the appellant's barefoot and fingerprint impressions in blood inside Shelly's home.

20. ...There were numerous footprints, barefooted and with footwear, on the floors.

24. ...What is evident is that there were numerous footwear impressions and barefoot print impressions throughout the house. These impressions were made on the floor and were in the victim's blood.

25. Constable Geoff MacLeod was qualified to give opinion evidence with respect to finger and footprints. Constable MacLeod testified that he found the appellant's right great toe print as part of a barefoot print impression in blood in one of the bedrooms. Furthermore, it was his opinion that all of the barefoot impressions in the blood throughout the house were the same, in terms of toe area, the heel, ball and arch.

29. Constable Mark Christiansen was qualified, without objection, to give opinion evidence on finger and footprints. He carried out a comparison of the left great toe of the appellant with a barefoot impression found in blood on the floor of the victim's kitchen. It was his opinion that the barefoot impression was made by the toe of the appellant. He also identified two latent fingerprints deposited in blood on the trim of the bathroom door jamb as being those of the appellant's left ring and middle fingers.

34. ...The police obtained a general warrant to compel the appellant to provide footprint impressions. The warrant was forwarded to the Vancouver police who detained the appellant pursuant to the warrant and took impressions of his feet.

35. ...The appellant was arrested for the murder of the victim when a forensic examiner concluded one or more of the barefoot impressions in the victim's home were made by the appellant.

39. However, at other times he was in his bare feet. His barefoot prints were found in two different locations, one in the second bedroom – nowhere near the body of the victim, and the other in the kitchen.

111. ...he also, at some point, removed his footwear and left barefoot impressions in the victim's blood at locations inconsistent with merely checking the victim's life signs.

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## **R v. Dimitrov**

### Summary of applicable information

*This was a 1996 homicide case in Ottawa where the identification of the accused was based off two things: eye-witness testimony and a pair of boots with the victim's blood on them that were 'likely' worn by the accused. Although this is a*

*'foot morphology' case the decision by the appellate court makes a statement (paragraph 40) that supports bare footprint testimony in Canadian courts.*

**Appeal Decision - Citation: R. v. Dimitrov, 2003 CanLII 50104 (ON CA)**

[40] Although footprint impression evidence is routinely accepted by courts [See Note 3 at end of document], the same cannot be said of evidence of barefoot impressions in shoes.

Note 3: See R. v. Ferguson (2000), [2000 CanLII 5658 \(ON CA\)](#), 142 C.C.C. (3d) 353, 35 C.R. (5th) 290 (Ont. C.A.) in which Laskin J.A., in dissent, upheld the admissibility of Sergeant Kennedy's footprint impression evidence, which dissent was endorsed by the Supreme Court of Canada at [2001 SCC 6 \(CanLII\)](#), [2001] 1 S.C.R. 281, 152 C.C.C. (3d) 95 although the Supreme Court did not explicitly endorse Justice Laskin's dissent on the issue of footprint impression evidence.

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## **R v. Ferguson**

### Summary of applicable information

*David Horne was shot by his wife Lorie Ferguson when they struggled with a loaded rifle after a heated argument. Bare footprints were developed in the basement where the rifle was located, most belonging to Ms. Ferguson. She was convicted by a jury but appealed the decision based on a number of issues, one of which was the judge allowing expert witness evidence on footprints without a voir dire. Two of the 3-judge panel granted the appeal although they did not speak directly to the footprint evidence except when laying out the facts of the case (See paragraphs 22 and 23 below); however the dissenting justice – John Laskin - did address the issue of the footprint evidence (as seen in paragraphs 63-67 below). This is noteworthy because the appeal that was granted was thereafter appealed to the Supreme Court of Canada wherein the SCC endorsed Justice Laskin's dissent and reversed the decision of the Ontario Court of Appeal. (See below)*

**Appeal Decision - Citation: R. v. Ferguson, 2000 CanLII 5658 (ON CA)**

[22] Footprint evidence was gathered in the basement, but resulted in only 10 footprint imprints being found, most of them identified as belonging to Ms. Ferguson. None of them belonged to Mr. Horne or Simone, despite uncontradicted evidence that all four members of the family had been in the basement on June 16th.

[23] In his charge, the trial judge told the jury to disregard the evidence of the footprint expert because it was of doubtful probative value given how few footprints were taken and that there was no way to determine how old they were.

*The following is from the dissent opinion by Justice Laskin J.A:*

Second Issue – Did the trial judge err in permitting the Crown to lead the evidence of an expert on footprints without holding a voir dire?

[63] The Crown led the evidence of an expert on footprints, Sergeant Kennedy, to show that the appellant, not her husband, retrieved the rifle from the basement of their home. Sergeant Kennedy examined ten footprints in the basement area. He concluded that neither Rick Horne nor his daughter made any of the footprints. The appellant likely made three of the footprints, could have made one other, and could not be ruled out from having made the other six.

[64] The appellant submits that the trial judge erred in admitting Sergeant Kennedy's evidence without holding a voir dire into his qualifications and into whether footprint analysis was a recognized field of expertise. The appellant concedes that defence counsel at trial did not object to the admissibility of Sergeant Kennedy's evidence, but argues that the trial judge nonetheless should have scrutinized the evidence to ensure its admission would not distort the jury's fact finding process.

[65] I find no merit in this submission. Although no formal voir dire was held, Sergeant Kennedy testified regarding his qualifications and the international recognition accorded footprint analysis and comparison as a field of expertise. This evidence showed that since 1968 footprint analysis has been the subject of expert opinion evidence in countries throughout the world, including the United States and Canada, and that Sergeant Kennedy is one of the Canadian experts in the field.

[66] Defence counsel asked Sergeant Kennedy no questions about either his qualifications or his being able to express an opinion on the ten footprints in question. Instead, in response to the Crown's request that Sergeant Kennedy "be allowed to give his opinion evidence in the field of bare foot comparison," defence counsel said "I have no questions of this witness about his qualifications, nor any argument to make." Defence counsel, in my view, recognized that Sergeant Kennedy's opinion evidence met the criteria for admissibility established by the Supreme Court of Canada in *R. v. Mohan*.<sup>2</sup>

Indeed, two other appellate courts have already accepted footprint analysis as an appropriate subject for expert evidence.<sup>3</sup>

[67] Moreover, I have little concern that Sergeant Kennedy's evidence would have distorted the jury's fact finding deliberations. The evidence itself was inconclusive and the trial judge suggested to the jury that it was "of questionable significance." I would not give effect to this ground of appeal.

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### **Supreme Court of Canada Appeal Decision - Citation: R. v. Ferguson, 2001 SCC 6**

... we are all of the opinion that this appeal as of right be allowed, substantially for the reasons of Laskin J.A. in the Ontario Court of Appeal.

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## **R v. Hernandez**

### Summary of applicable information

*In April 2006 five men kidnapped Graham McMynn from his vehicle in a Vancouver suburb. Over the course of the next 8 days he was moved between three different houses and confined in a closet until April 12<sup>th</sup> when the Vancouver Police and RCMP rescued him from the 3<sup>rd</sup> location. Various footprint impressions were developed at all 3 locations which were subsequently identified to the victim and accused individuals. The judge outlined in his decision that the footprint evidence was among "the most important evidence in the case."*

### **Trial Decision - Citation: R. v. Hernandez, 2008 BCSC 1376**

[38] I am satisfied that he was kept in those three houses, and the evidence which leads me to this conclusion is as follows:

...4. His fingerprints and footprints in various of those locations.

[56] Amongst the categories of evidence that were gathered and presented to the court are the following:

...6. Fingerprint and Footprint Evidence.

[110] The assessment of findings of DNA in this case, together with that of fingerprints and footprints, is the most important evidence in this case.



[118] Fingerprints and footprints of McMynn and of some of the accused were found at various relevant locations which I will refer to and assess later in this judgment.

[120] Prints of McMynn were found in each of the following locations:

(1) House #1

...(c) his footprints were found on the floor of the bathroom which he was permitted to use.

(2) House #2

(a) his footprints were found in the bedroom in which he was kept.

[217] The prints of Sam Vu were found in the following locations:

(1) House #1

(a) a footprint of his left great toe, and of the sole of his right foot, were found on the floor of a bathroom.

(3) House #3

...(c) footprints and fingerprints on several of the green garbage bags in the hallway collectively containing, or in the vicinity of, various incriminating items previously referred to.

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## **R v. Mikic**

### Summary of applicable information

*Baljinder Sidhu is stabbed to death in August 2011 after a dispute outside a Winnipeg bar. Barefoot impressions in blood were identified to the victim.*

### **Ruling on Validity of DNA Warrant - Citation: R. v. Mikic, 2016 MBQB 225**

A major area of bloodletting contained a set of barefoot impressions, which were matched to Sidhu

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## **R v. Newman**

### Summary of applicable information

*Marc Rozen is found murdered in his Vancouver apartment in January 2004. Bloody impressions of bare footprints, socked feet and footwear are found throughout the apartment.*

**Trial - Citation: R. v. Newman, 2013 BCSC 592**

[74] Sergeant Hamilton, who was qualified as an expert in crime scene examination, including the detection, development, preservation, and comparison of latent fingerprint, footprint, and footwear impression evidence, attended Mr. Rozen's apartment ... noting and developing footprint and fingerprint impressions.

[84] Sergeant Hamilton documented numerous foot impressions found at the scene. The visibility of many of them was enhanced by the use of chemicals that react to blood by turning green.

[85] Exhibit 36 is a scale drawing or plan of Suite 1106 showing the location and direction of the foot impressions as they were numbered by the police investigators. Some of the prints appeared to be barefoot, some sockfoot, and some were shoe impressions.

[139] Once the Vancouver police knew that Michael Newman was in custody, they obtained warrants, pursuant to which DNA blood samples and known foot impressions were taken from him.

[140] Sergeant Massey, who was qualified as an expert...

[141] In her opinion, the accused can be eliminated as a source of the barefoot impressions numbered 68, 34, and 37. In her opinion, these three are all consistent with having come from the same person's right bare foot.

[303] ... On the footprint chart that was marked Exhibit 277, there are very few bloody barefoot prints attributed to the deceased. There are a few of the deceased's barefoot prints in the kitchen and one in the entrance to the master bedroom...

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## **R v. Rothgordt**

### Summary of applicable information

*James Shannon is found murdered in his Vancouver Island home on February 14, 2008. Bare footprint impressions are found in the bathroom of the home and are identified to the accused, Kim Rothgordt.*

**Trial - Citation: R. v. Rothgordt, 2014 BCSC 1215**

[254] In addition, fingerprint and footprint (friction ridge) impressions, footwear impressions, blood spatter patterns, and samples for DNA collection and analysis were obtained from various items and surfaces inside the residence. The evidence obtained from the scene and the body of the deceased clearly places the accused inside the residence and in physical contact with the deceased and provides insight as to what occurred between them and the actions of the accused after Mr. Shannon was dead.

[256] Cpl. Allen was qualified to provide expert evidence in relation to the discovery and identification of fingerprints, more specifically called friction ridge analysis, which relates to prints from hands, palms and the soles of the feet. He is a designated fingerprint analyst pursuant to s. 667(5) of the *Criminal Code*. He is also qualified as a senior forensic officer, qualified to provide expert evidence in court.

[265] The bathroom was also in disarray; the doors to the medicine cabinet and the cabinet under the sink were open; and, towels and other fabric items were on the floor (Exhibit 4, Photos 24-26). Under those items police found bare footprints and several footwear impressions (analyzed by Staff Sgt. Richard).

Staff Sgt. Richard - conducted fingerprint, footprint and footwear comparisons

[295] Staff Sgt. Alain Richard provided expert evidence with regards to the discovery and the identification of fingerprints and footprints and the physical comparison of evidence, namely footwear in relation to the police investigation at Mr. Shannon's residence. He compiled a book of photographs to document his work (Exhibit 44). He focused his attention on three main areas: the footprints and shoe impressions on the bathroom floor

[296] Staff Sgt. Richard found 12 foot impressions on the bathroom floor once the items on the floor had been cleared. Some of them were identifiable and some were not. An impression of a left bare foot marked R24 was facing the open door of the bathroom and therefore the east wall of the residence. It had water stains on it and was not suitable for analysis. A number of other bare foot impressions, some with water stains, were oriented in different directions. Staff Sgt. Richard identified two footprint impressions, R29 and

R30, as both being made by the right foot of the accused as compared to his known footprint impressions (Exhibit 35).

[297] Staff Sgt. Richard also found a footprint impression made by Mr. Shannon's left foot, R32, facing towards the cabinet under the bathroom sink...

[298] ... He determined that R34 was made by the accused's bare left foot.

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# Admissibility

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## The Fingerprint Sourcebook – Chapter 13

### FINGERPRINTS AND THE LAW

**Andre A. Moenssens and Stephen B. Meagher**

#### 13.1 Introduction

Fingerprints, palmprints, and impressions of bare soles have been widely recognized and accepted as a reliable means to identify a person. A reproduction of the friction ridge arrangements on a fingerprint, palmprint, or footprint may be left on an object when it is touched. This permits the impression to be used for the personal identification of individuals in criminal investigations. Thus, the forensic science of fingerprints, palmprints, and footprints is utilized by law enforcement agencies in support of their investigations to positively identify the perpetrator of a crime. This forensic science is also used for exculpatory or elimination purposes.

#### 13.4.3 Admissibility of Footprints as Proof of Identity

*Commonwealth v Bartolini, 299 Mass. 503, 13 N.E.2d 382, cert. denied 304 U.S. 562 (1938)*

Bartolini had been identified as the maker of a bare sole print found on the linoleum floor of the bathroom where a murder was committed. The courtroom battles about the admissibility of this type of evidence were fierce. Several pioneers in friction ridge impression evidence were called as expert witnesses to buttress the testimony of the Massachusetts State Police expert who, although qualified as a fingerprint expert, was not found to have sufficient experience with footprints.

Bert Wentworth, co-author of the influential and scholarly book *Personal Identification*, and Fredrick Kuhne of New York, who had served as an expert in cases involving the footprints of babies in hospitals, testified that the friction skin on the soles of the feet was as unique as that on the fingers and palms. After hearing Wentworth and Kuhne's testimony, Bartolini was convicted. The conviction was affirmed in a relatively brief opinion. The Massachusetts Supreme Judicial Court stated, in part:

There was no error in permitting the expert Wentworth to testify that footprints of a naked foot on the linoleum of the bathroom at the house of the deceased were made by the same person who had made prints at the police station identified as those of the defendant. There was ample evidence of special study and knowledge by this witness of the subject of footprints as well as of finger prints. . . . There was also ample evidence

that footprints, like finger prints, remain constant throughout life and furnish an adequate and reliable means of identification.

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## Chicago-Kent Law Review

The following is an excerpt from the 'Chicago-Kent Law Review' published in 1963.

The cover page outlines the author and his credentials.

# CHICAGO-KENT LAW REVIEW

*Copyright 1963, Chicago-Kent College of Law*

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## ADMISSIBILITY OF FINGERPRINT EVIDENCE AND CONSTITUTIONAL OBJECTIONS TO FINGER- PRINTING RAISED IN CRIMINAL AND CIVIL CASES

ANDRE A. MOENSSENS\*

**T**HE ADMISSIBILITY OF FINGERPRINTS as evidence of identity was established many years ago. Yet many, and often complex, problems still arise from time to time with regard to this kind of evidence. Expert's qualifications are doubted; the applicability of established rules of evidence to a particular situation is put in issue; the right of the police to record an arrestee's fingerprints before conviction is challenged on constitutional grounds. With the United States Supreme Court showing an increased propensity for extending the protection of human liberties, areas that have heretofore been considered untouchable may have to be re-examined.

### INTRODUCTION

The epidermal skin of the palmar surfaces of the hands and the plantar surfaces of the feet bear intricate patterns, formed by fine friction ridges. Each ridge bears a row of sweat pores. When perspiration flows out of the pores, it courses over the ridges. As a result of this, when a digit touches a smooth surface, a perspiration impression of the ridges is left on that surface. This is called a latent impression. Although frequently invisible, the design can be made to appear quite distinct through the proper use of fingerprint powders, chemical solutions, and vapors.

\* The author is head instructor at the Institute of Applied Science where he teaches fingerprint identification, having joined the staff in 1960. He is a member of the International Association for Identification, the American Academy of Forensic Sciences, the American Society of Criminology, and associate editor of FINGER PRINT and IDENTIFICATION MAGAZINE.

The last page of the document, paragraph 2 draws the following conclusion:

*“Palmprints, footprints and toeprints are made up from the same minute friction skin details as are the fingerprints. There is absolutely no biological, physiological or physical difference between the friction skin found on any of these surfaces. Friction skin patterns from the palms of the hand and the soles of the feet may be identified the same as fingerprints. As a general rule, such evidence is admissible when offered by a competent and qualified expert witness.”*

FINGERPRINT EVIDENCE

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if the crime scene prints could have been deposited there when the accused was lawfully at that place. The prosecution, therefore, must prove that the crime scene prints he offers in evidence are inconsistent with the defendant's alleged absence from the scene at the time the crime was committed.

Under the proper circumstances, some jurisdictions allow the introduction of fingerprint record cards from foreign jurisdictions, provided such cards are duly authenticated, for the purpose of providing enhanced punishment.

Palmprints, footprints, and toeprints are made up from the same minute friction skin details as are the fingerprints. There is absolutely no biological, physiological or physical difference between the friction skin found on any of these surfaces. Friction skin patterns from the palms of the hand and the soles of the feet may be identified the same as fingerprints. As a general rule, such evidence is admissible when offered by a competent and qualified expert witness. As yet, there have been no reported cases in the United States involving only toeprints. If the time comes when the admission of toeprint evidence is at issue, the evidence will in all likelihood be ruled admissible. There is no sound reason for its refusal. Actually, the only significant difference between palmprints and footprints on one side, and fingerprints on the other, is that the latter are recorded as a matter of police routine, then classified, and filed. Palmprints and footprints are not recorded generally, although some police departments do maintain palmprint files of known burglars and car thieves.

Law enforcement officers can fingerprint persons incident to a lawful arrest. In so doing, they do not violate the constitutional privileges and immunities of the subject being fingerprinted. Fingerprinting has become commonplace in our modern world, and is no longer associated solely with crime. Many employers fingerprint their personnel; the armed forces keep fingerprint records of all enlisted and civilian personnel; the FBI maintains its separate civilian fingerprint file which has often been of great value in the identification of disaster and amnesia victims. Fingerprinting is therefore not a “badge of crime,” and does not subject a person to mortification and humiliation *per se*. It is merely a

## **Infant-to-Adult Footprint Identification**

**Journal of Forensic Identification**  
**57 (4), 2007 \ 485**

### **Case Report**

*Rick Sinclair*

*Craig Fox*

*New South Wales Police*

*Fingerprint Operations*

*Forensic Services Group*

**Abstract:** A case report involving the examination of an infant footprint against an adult exemplar to establish citizenship in the United States.

*“The comparison of footprint records to establish positive identification of individuals is a universally accepted practice within the fingerprint science. There is no biological or physiological difference between the friction ridge skin on the palmar or plantar surfaces, and they each possess the same value for identification purposes.”*

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## **The Friction Ridge Skin of the Feet**

**Encyclopedia of Forensic Sciences, Second Edition**

**D. Johnson, Las Vegas Metropolitan Police Department, Las Vegas, NV, USA**

*“...The same type of friction ridge skin that covers the surface of the hand also covers the soles of the feet. It is both persistent and unique through the same mechanisms as that of the friction ridge skin of the hands.”*

*“...The same principles of identification that are employed in fingerprint and palm print identification should be used in footprint identification. As footprints and toe prints are not routinely compared by latent print examiners, care should be employed. The question of how much is enough, still an unanswered question in the areas of fingerprint and palm print identification, has received even less attention in the footprint identifications.”*



# Biology of Plantar Skin

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## 1904 - The Ventral Surface of the Mammalian Chiridium with special reference to the conditions found in man

Inez L. Whipple and Harris Hawthorne Wilder (1904)

Anatomists - Smith College, Massachusetts

The most characteristic facts with regard to the structure of the volar and plantar skin may be grouped into (1) those which appear from a study of the external surface of the skin and (2) those which are brought out by means of the study of the inner surface of the epidermis, which is of course the negative of the outer surface of the cutis. Externally then, the volar and plantar skin shows itself distinctly different from the general skin of the body in the complete absence of hair, the relatively small amount of pigment, and the ridged sculpture of the surface. Along the middle of each ridge may be seen, often with the unaided eye, the orifices of sweat glands arranged in a single row. There is

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## 1918 - Personal Identification; methods for the identification of individuals, living or dead

### Harris Hawthorne Wilder

Harris Hawthorne Wilder was an American zoologist and anatomist.

Professor of zoology at Smith College, Massachusetts

**T**HE skin covering the lower surfaces of the hands and feet, including the palms, the soles, and the balls of fingers and toes, differs markedly from that of the general body surface. It is entirely without hair, which, in rudimentary condition at least, covers the rest of the body; it is without the pigment or coloring matter which, even in a white person, is present elsewhere in some quantity; and, what is important for us, *it is covered with minute ridges, in some places running in parallel course, like a piece of corduroy, and in others forming various kinds of loops, spirals, or whorls, known as "patterns."* In many of the lower

## 1943 - Finger Prints, Palms and Soles – An introduction to Dermatoglyphics

Harold Cummins and Charles Midlo (1943)

Professor of Anatomy - Tulane University, Louisiana

### RIDGED SKIN

**T**HE palmar and plantar surfaces of the human hand and foot are clothed by skin which is different from that covering other parts of the body. The skin here is continuously corrugated with narrow ridges and there are neither hairs nor sebaceous (oil) glands. Sweat glands are abundant and of relatively large size. Further distinctions of thickness and of histological structure, are observable by dissection and by microscopical examination. Ridged skin is not strictly confined to the palmar and plantar surfaces. Ridges occur over the tips of digits, and on the digital margins, where as along the margins of the palm and sole they extend about halfway to the dorsal surface. The extent of ridged skin is em

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## 1991 - Embryologic development of epidermal ridges and their configurations

Article in: Birth defects original article series · February 1991

Volume 27, Number 2, pages 95-112

**Dr. William J Babler**

Indiana University Bloomington

*...it is important to have an appreciation of the developing surface topography of the hand and foot, especially as to how surface changes correlate with subsurface cellular changes. This discussion will center on hand development. Development of the foot follows a similar chronology with the exception that foot development lags behind hand development by about 1 week.*

*...The development of epidermal ridges is preceded by the formation of localized eminences, volar pads, on the ventral apical region of the digits as well as on the interdigital, thenar, and hypothenar regions of the palms and soles.*

*...Volar pad development on the foot follows a similar chronology with the exception that volar pads of the foot lags behind the hand by about 0.5 week. A tibiofibular gradient in development is present. Regression of volar pads on the foot begins around 12 weeks.*

## **2001 - Interpapillary Lines - the Variable Part of the Human Fingerprint**

**Journal of Forensic Sciences, Vol. 46. No. 4, pp. 857-861.**

**Stücker M., Geil M., Hyeck S., et al. (2001).**

*...The dermatoglyphic pattern of human palms and soles is individually unique and unchanging.*

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## **2013 - The Friction Ridge Skin of the Feet**

**Encyclopedia of Forensic Sciences, Second Edition**

**D. Johnson, Las Vegas Metropolitan Police Department, Las Vegas, NV, USA**

*...Between 6 and 13 weeks of gestation, the feet will develop from flat paddlelike structures to something that resembles an infant's foot. Although at 6 weeks there are interdigital notches in the hands, they do not form in the feet till about 7 weeks. At about 8 weeks, the toe rays have formed and the heel is raised. At 9 weeks of gestation, the thenar, hypothenar, and interdigital pads are formed and one of the primary creases, the metatarsophalangeal creases, is visible. At 11 weeks of gestation, the pads have begun to regress, and by 13 weeks, the pad regression is all but complete on both the hands and the feet. Most of the primary creases have formed, but there is still some development of creases up until 20 weeks of gestation. While all fetuses will undergo the sequence of events described above, there will be variation between the size, shape, and timing of the regression of the volar pads. All these factors help contribute to the unique friction ridge pattern that is formed on the feet.*

**Wiley Encyclopedia of Forensic Science**

First published: 15 September 2009

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- **Friction Ridge Skin: Comparison and Identification**
- Glenn Langenburg
- Carey Hall
- First published: 15 March 2013

**Embryological development of human palmar, plantar, and digital flexion creases.**

Anat Ret 216:191-197, 1986

Kimura S, Kitagawa T

Images from OPS homicide case with bare footprint evidence. Upon completion of trial.

# Training

## Ron Smith and Associates, Inc - Footprint Course

CLASS FLYER

PAGE 1 OF 1

**RON SMITH AND ASSOCIATES, INC.**

### COMPARISON OF PLANTAR FRICTION RIDGE IMPRESSIONS

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Jon Stimac, CLPE

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**\$300.00 Tuition**

**This course is approved for IAI certification and recertification purposes**



**RS&A recommends taking our classes in order of our Sequential Training Curriculum**

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**GO TO NEXT PAGE FOR COURSE BROCHURE**

#### CLASS CONTACT

B.L. Smith, Training Coordinator  
Sandy City Police Department  
801-568-7240  
blsmith@sandy.utah.gov

#### CLASS LOCATION

Sandy City Police Department  
10000 South Centennial Parkway  
Sandy, UT 84070

Class Times: 8:00 a.m. to 5:00 p.m.

#### LODGING INFORMATION

Although we cannot endorse any particular hotel property, we have confirmed that the following lodging is within a reasonable commuting distance to the training site.

See additional pages 4-7

#### TARGET AUDIENCE

This course is designed for the intermediate-level student; it is not an introductory-level course. Tenured analysts will benefit from both the course content and the practical exercises, but attendees without prior comparison experience or at basic-level of comparison experience should satisfy that level of training prior to participating in this course. Students with experience levels between six months and 20+ years have attended this course.

#### SPECIAL NOTES FOR STUDENTS

Each student must bring a fingerprint magnifier, ridge counters are encouraged but optional and a notebook.

Dress is business casual as the course will be conducted in a professional environment and facility.

**RON SMITH AND ASSOCIATES, INC.**

**COMPARISON OF PLANTAR FRICTION RIDGE IMPRESSIONS**



**Class Instructor:  
Jon Stimac, CLPE**

**2 Day Course**

**16 Training Hours**

**\$300.00 Tuition**

**This course is approved for IAI certification and recertification purposes**



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**COURSE DESCRIPTION**

Due to their infrequent submission into forensic laboratories, friction ridge impressions recovered at the scene of a crime that originate from the foot/sole (plantar) can challenge even the most tenured comparison analyst. Additionally, it is very likely that if you have never received formal training specific to analyzing and comparing plantar impressions, you have probably misinterpreted a plantar impression as coming from a palm or a finger! Even if the interpretation, analysis and comparison is not problematic, what are the subsequent legal aspects? This 16-hour course is designed to provide the participant with the biological fundamentals, legal admissibility scenarios, source recognition, recording techniques and a vigorous practical comparison experience with plantar friction ridge impressions.

Numerous practical exercises, supplemented by lectures and discussion are among the techniques used to provide the attendee with a tangible comparison experience with plantar impressions. The attendee will leave the course with valued experience and an increased knowledge of associated philosophies and methodologies.

**TARGET AUDIENCE**

This course is designed for the intermediate-level student; it is not an introductory-level course. Tenured analysts will benefit from both the course content and the practical exercises, but attendees without prior comparison experience or at basic-level of comparison experience should satisfy that level of training prior to participating in this course. Students with experience levels between six months and 20+ years have attended this course.

**DAILY SCHEDULE**

	Day 1	Day 2
Hour 1	Registration / Course Overview / Introductions	Plantar Recording Techniques
Hour 2	Jon's Commentary & Philosophy	Plantar Comparison
Hour 3	Plantar Lecture	
Hour 4	Legal Aspects	Contemporary Issues & Video
Lunch	Lunch	Lunch
Hour 5	Terminology & Tracing Exercise	Plantar Comparison
Hour 6	Plantar Association	
Hour 7	Plantar Comparison	Plantar <i>Bingo!</i> & Plantar <i>Jeopardy!</i>
Hour 8		Closing Comments & Questions

**SHOULD BE ABLE TO PERFORM**

- \* Upon successful completion of this course, the student will be (better) able to:
- \* Understand and utilize Level I Detail of plantar impressions
- \* Understand and utilize Level II Detail of plantar impressions
- \* Understand and utilize Level III Detail of plantar impressions
- \* Understand the differences (and similarities) of ridge flow characteristics between plantar, palmar and fingerprint impressions
- \* Understand and utilize the ACE-V identification process of plantar impressions
- \* Understand and demonstrate key aspects of the analysis process (recognition/distinguish of plantar impression, substrate, matrix, etc.)
- \* Conduct basic, intermediate and advanced comparisons of plantar friction ridge impressions
- \* Document conclusions of an analyzed latent plantar impression
- \* Understand basic problems and practices in comparing plantar impressions
- \* Understand the past legal admissibility and the present legal components of plantar impressions.

**MUST BRING TO CLASS**

There will be numerous 1:1 comparison exercises conducted throughout this course; therefore, fingerprint magnifiers are required. Ridge counters are encouraged but optional and each student must bring a notebook. A portable lamp/light should be considered.

Dress is business casual as the course will be conducted in a professional environment and facility.

**RON SMITH AND ASSOCIATES, INC.****COMPARISON OF PLANTAR FRICTION RIDGE IMPRESSIONS****PRE-REQUISITES**

Attendees without prior comparison experience or presently at basic-level of comparison experience should satisfy that level of training prior to participating in this course. Students will be expected to participate in the daily performance of intermediate-level comparisons, including, but not limited to, offering opinions, answering questions directed at the student, and giving a position on an issue. Students are in a training environment and as such will be encouraged to explore new concepts, procedures and ideas.

**RECOMMENDED READING**

*Cummin & Midlo, Fingerprints, Pains and Soles, Chapter 6-Soles, Dover Publications, 1943, pp 120-140.*

*Moenssens, A., Fingerprints and the Law, Chilton Book Company, 1969, pp 60-62, 136-143, 207.*

*Wiley Encyclopedia of Forensic Science, Friction Ridge Skin: Morphogenesis and Overview, Wiley & Sons, LTD, 2009.*

**I.A.I. APPROVED TRAINING HOURS**

This course provides 16 training hours and is approved for IAI Certification and re-certification.



