

The use of palm print comparison for criminal investigation and prosecution

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Table of contents

Foreword	4
Summary.....	5
Reason for the study.....	5
Methods.....	6
Dactylography.....	6
The practice of palm print comparison.....	7
Court decisions and case files.....	8
Comparative law studies.....	9
Introduction.....	10
Background to the research.....	10
Palm comparison.....	11
Research question.....	12
Methods.....	12
The palm comparison.....	14
Introduction.....	14
Forensic investigation.....	14
Dactylography.....	14
HAVANK: database for dactylographic traces and prints.....	16
Dactylographic comparison.....	16
Palm comparison in practice: police and public prosecution.....	18
Introduction.....	18
Research methods.....	18
Types of offense.....	19
The added value of palm traces for the investigation.....	21
Application of palm comparison in practice: court decisions.....	25
Introduction.....	25
Method: sample of court decisions and files.....	25
Criminal offenses.....	26
The role of the palm trace in the case.....	27
Conclusions of dactylographic reports.....	29
Dealing with the palm comparison reports by the courts.....	30
Counter-expertise.....	31
Legal comparison.....	32

Conclusions	33
The added value of palm prints	33
Reporting on palm comparison.....	34
The use of palm print comparison by the courts	34
Literature	35
Appendix 1: Examined court decisions	37

Foreword

Technical forensic evidence is becoming increasingly important. One reason for this is that suspects more often choose to remain silent when questioned by the police. Dactylography is a long-established forensic method that can be used to check whether finger or palm traces found at the crime scene match those of a suspect or others.

Commissioned the *Research and Documentation Center* (WODC) of the Ministry of Security and Justice, The *Netherlands Institute for the Study of Crime and Law Enforcement* (NSCR) and the *Vrije Universiteit* have investigated the taking, use and storage of palm prints, as well as the added value of this type of forensic evidence. We are the supervisory committee for this research very grateful for its expert advice and support during the execution of the research. The sounding board group that was set up also provided valuable advice and protected the researchers from any inaccuracies when writing the report and drawing conclusions.

With the aim of reaching an international audience, the report of this study (*De toepassing van handpalmafdrukken voor de opsporing en vervolging*, Amsterdam, 2017) has been summarized and translated in English. The translated report focuses primarily on the added value and the actual practice of the use of hand palm comparison. Parts that focus on the Dutch legal framework and parts that seem of minor interest for readers from other countries than the Netherlands have been largely omitted from this translation.

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Summary

Reason for the study

Each hand shows a pattern of lines, the so-called papillary lines. These lines run in the palm of the hand and continue onto the fingers. As far as we know, each person has a unique pattern of lines. Fingers and hands can leave traces on surfaces or objects, which are referred to as 'dactylographic traces'. These are pre-eminently suitable for investigation of crimes, for instance to establish by whom the traces at a crime scene have been left, and whether these traces are possibly those of the suspect. The fingerprint trace is one of the oldest and most effective means of identification. It has proven to be invaluable to the police and the Public Prosecution Service. Although fingers and palms of hands have no essential biometrical difference, Dutch legal standards do clearly distinguish between fingers and palms. This distinction can be explained by the different purposes for which fingerprints and palm prints are collected.

Fingerprints are primarily taken for the purpose of establishing the suspect's identity. When a suspect has been arrested, fingerprints are taken and sent to VVI (Dutch Facility for Verification and Identification, in Dutch: *Voorziening voor Verificatie en Identificatie*) and HAVANK (the Automated Fingerprint System Dutch Collection, in Dutch: *Het Automatische VingerAfdrukkensysteem Nederlandse Kollektie*). The suspect's identity can be established by comparing the finger traces with prints that were taken and saved earlier. On top of that, fingerprints are used for investigation purposes. It is established whether the fingerprints that have been secured, are identical to the fingerprint traces found at a crime scene. HAVANK contains both fingerprints taken from suspects and traces secured earlier at crime scenes. The databank enables automated searches for matches between saved and new fingerprints or between fingerprints and traces. In that way, suspects can be linked to criminal offenses of which they are not yet suspected.

Palm prints are only used to find possible matches with palm traces. Therefore, in the Netherlands they can only be taken if an individual is thought to have been involved in a criminal offense related to which palm traces have been found at the crime scene. The palm prints taken from a suspect are saved in HAVANK, after which an automatic search is conducted for any matches with palm traces that were saved earlier. Since fingerprints and palm prints are thus collected for different purposes, separate legal provisions regulate the collection of these prints. The collection of palm prints is allowed only if an order from the public prosecutor is available, and securing palm prints is necessary in the interest of the investigation (article 61a paragraph 1 sub b and article 62a of the Dutch Code of Criminal Procedure). This interest is usually assumed to exist if a palm trace has been found at the crime scene and the suspect is believed to have been involved in that offense. The statutory provision therefore does not prescribe the default collection of palm prints of arrested suspects, as it does for the securing of finger prints.

The police and the Public Prosecution Service stress that they need palm prints to be taken by default in order to increase the effectiveness of investigation activities. They argue that other European countries do take palm prints by default.

The above issues and questions were the reasons behind this research. The research question is:

What is the added value of using palm prints for the identification of suspects and their prosecution and trial in criminal courts as compared to fingerprints and other types of forensic evidence?

Below, the research methods will first be set out briefly. Second, the subsequent research phases and results will be summarized.

Methods

By means of ‘triangulation’ (i.e. the combining of various research methods) an attempt was made to provide an elaborate overview of the actual use in practice of palm traces for investigation and prosecution purposes and the added value of this forensic method. The Dutch implementation practice was analyzed using figures on dactylographic traces and prints, on both the use of DNA traces and prints, and the matches that were returned when comparing these.¹ Next to that, 22 officers of the police and the Public Prosecution Service were interviewed on how they process (requests for) palm print comparisons.

Also, court decisions published at the website Rechtspraak.nl in criminal cases where palm prints were used for the investigation (N=43) were analyzed with help of a checklist. In addition, ten criminal case files were studied in which palm print comparisons played a role, again using a checklist.

Dactylography

Dactylography refers to the study of papillary lines, which are the lines in the skin on the inside of the finger, palm, toe and foot. It also includes the study of prints and traces that can be left by papillary lines on surfaces. A distinction is made between a print and a trace. A *print* is a reference print of the papillary lines that was taken of a person under controlled circumstances. Prints used to be taken using ink. Today, they are usually collected by using a scan, at least in case of fingerprints. A *trace* is the print of the papillary lines found at the crime scene.

One of the aims of dactylography is *individualization*, i.e. to establish whether a certain individual is the source of a finger or palm trace that is linked to a presumed criminal offense. Fingerprints are also taken in order to establish an individual's identity. In this, two methods can be distinguished: identification and verification. *Identification* means that the identity of the person involved is established, as part of the application of criminal law rules. *Verification* is the process whereby test material collected is compared one-to-one to reference material of one specific individual. In the latter case, the identity of the suspect is already suspected, so that it only requires verification.

For the purpose of the investigation of a crime it is important that a trace linked to a criminal offense matches with a unique source. This requires that the print has unique characteristics which correspond to other prints of – only – that source and that these unique characteristics remain unchanged over a longer period of time. This is generally thought to be the case for dactylographic traces and prints, including those of the palm. It is assumed that such patterns of papillary lines are unique, and that no pattern is similar to any other.

¹ These figures have been omitted from this English translation of the report. See Malsch et al., 2017; De Wilde et al., 2017.

5. Palm traces can rather easily provide for information on the activity level: what actions brought this trace at this location.

Court decisions and case files

The analysis of a sample of Dutch court decisions (43) found at the website Rechtspraak.nl, and court files of ten specific cases, shows that palm print comparisons have been used with some regularity to substantiate court decisions. The question how often this is the case in general cannot be answered properly on the basis of the selection, as only part of all court decisions is published at Rechtspraak.nl. The sample may produce a somewhat biased view since only cases that are thought to be of a particular interest to a certain audience are published on the website. In some of the cases studied, the palm trace was the only or the most crucial trace that linked the suspect to a crime scene.

In all cases studied, it was stated that the trace found matched the palm print of the suspect. Both specialists and judges often expressed themselves in absolute terms: the trace and the print were said to be 'identical'; dactylographic traces were 'non-recurrent'; the suspect was the 'donor' of the trace, and it was 'out of the question' that anyone else could have been the donor of the trace. Cases from more recent years show expert conclusions in significantly less strong terms. Judges literally cite and follow the opinions of dactylographic experts in almost all of the cases.

The case files show that there can be important differences in opinion between experts when establishing the number of matching points between a trace and a print. The interpretation of palm traces and prints can at times apparently be problematic and may lead to varying expert opinions. However, in the final conclusion any difference of opinion between experts on the number of matching points found seems to have disappeared. It is unclear whether a different assessment of traces and prints in some cases could lead to an erroneous conclusion, for example due to an incorrect individualization, i.e. the palm of the hand is linked to the suspect, although this individual is not the donor. For this, see the famous Brandon Mayfield case, in which a considerable number of fingerprints examiners came to erroneous individualizations.

Given the fact that judges follow the conclusion of experts in virtually all instances, there is only a small chance that any incorrect individualization would come to light. In so far as could be concluded from the court decisions and the ten specific cases, uncertainty about the assessment of traces and prints was not explicitly raised or brought up for discussion, neither in the reports or records, nor in the court decisions.

Objections of attorneys in cases studied that put forward that there would be differences of assessments were dismissed in all cases by the courts. The same is true for defenses that traces could have been left at the crime scene at a different time. Requests for counter expertise were often not allowed.

In several of the cases studied, a specific activity has been deduced from a palm trace. In that sense, palm traces provide more information about the activities that have taken place during the offense than, for example, DNA traces, as they may indicate a grip, or the leaning of the donor of a trace against a wall or object.

Legal comparison

The text below is a summary of the legal comparison included in the Dutch version of this report (see Malsch et al., 2017; De Wilde et al, 2017.)

- Palm traces are rarely separately mentioned in the legislation of the countries studied. For example, use is made of the term 'fingerprints', which then includes palm prints as well (England & Wales), or terms such as 'papillary lines' (Austria) or 'prints of body parts' (Switzerland). In the Netherlands, fingers and palms are both specified in the statutory regulations.
- Because the same standards exist in Germany, Switzerland and England & Wales for taking fingerprints as for palm prints, in those countries palm prints may in theory be taken to establish the identity of the suspect. However, as in the Netherlands, palm prints are only used to determine who is the donor of a palm trace.
- Of the countries surveyed, only England & Wales have a default authorization for securing palm prints. However, this does not mean that palm prints are taken by default in every case.
- In Germany and Switzerland, taking palm prints must be 'necessary', which seems to correspond to the requirement of a 'research interest' in the Netherlands. In Germany and Switzerland, however, the necessity requirement is interpreted more broadly than in the Netherlands, because the taking of a palm print does not have to be related to the criminal offense of which the suspect is suspected.
- In Germany and Switzerland a legal remedy is available against the decision to take palm prints, while it is not in the other countries. This remedy is often applied when the collection is not related to a criminal offense of which the suspect is suspected.
- In Germany and England & Wales (senior) police officers are authorized to decide whether palm prints will be taken. This is also the case in Switzerland, but when the suspect refuses to cooperate, a public prosecutor must issue an order in this country. In the Netherlands, in principle only the public prosecutor is authorized to issue an order to take palm prints.
- In the countries studied, deprivation of liberty is not a condition for taking palm prints, while it is in the Netherlands.
- In Switzerland, non-suspects can also be forced to have palm prints taken. In the other countries surveyed, palm prints can only be taken from these individuals on a voluntary basis.
- The Netherlands, Germany, Switzerland & England & Wales have specific regulations for the storage and use of palm prints.

Reporting on palm comparison

Until a few years ago, dactylographic experts mainly used deterministic, absolute conclusions to indicate the similarity between a trace and a print. Courts generally copied the dactylographic experts' conclusions in their decisions. Fewer absolute conclusions have been used in recent years. An awareness seems to have arisen that subjectivity about, for example, the number of points of agreement between trace and print may play a role during the investigation and the trial of a case. The present study has shown that dactylographic experts may indeed differ in their assessments of similarities between traces and prints. In the cases where more than one dactylographic reports were found, the experts appeared to – sometimes substantially - disagree on the number of points of similarity between trace and print, without this affecting the final court decision on the individualization of the trace. To counteract possible undesirable consequences of this subjectivity, the police use a procedure in which several experts assess the traces independently of each other.

The use of palm print comparison by the courts

The analysis of court decisions and files shows that palm comparisons have been used with some regularity to substantiate a court decision. In some of the cases investigated, the palm trace was the only, if not the most crucial, trace that linked the suspect to the crime scene.

In all cases investigated, it was determined that the trace found matched the suspect's print. Both the experts and the judges often expressed themselves in absolute terms: trace and print would be 'identical'; dactylographic traces would be 'one off'; the suspect would be the 'donor' of the trace, it would be 'excluded' that someone else is the donor of the trace.

Uncertainty about the assessment of traces and prints, insofar as this could be deduced from the court decisions and the files, generally is not explicitly addressed, neither in the reports, nor in the court decisions. It is clear, however, that there can be a difference of opinion between experts; the interpretation of palm traces and prints is apparently sometimes problematic and can lead to differences between expert court decisions. Dactylographic traces and prints leave a lot of room for (subjective) interpretation (Dror, 2016, see the famous Brandon Mayfield case discussed above in this report).

Over time, Dutch experts have come to phrase their conclusions in less absolute terms with respect to individualizations. Courts, however, may still present these as absolute decisions and treat them as such. Judges seem not always aware of the potential uncertainties that may exist in dactylography. Moreover, Dutch courts deny most requests from counsel for counter expertise.

Dactylography, including palm print analysis, is not a hard science, and some even doubt it is a science at all.³⁷ While there are differences between the various types of forensic evidence, no evidence is absolutely hard and undisputable. Even DNA evidence, in the event of mixed or incomplete profiles, is uncertain.³⁸ The risks of uncertainties in the various types of forensic evidence can and must be combated by clear and comprehensive expert reporting that presents the inherent uncertainties. Courts must take the effort to fully understand the contents of such reports and, if they cannot, to ask for explanations and counter expertise, as well as to clearly justify their own decisions in their rulings to enable revision attempts in case of an incorrect decision (Malsch, 2021).

³⁷ See <https://www.aaas.org/report/latent-fingerprint-examination>.

³⁸ See Malsch et al. 2013, 2016; De Keijser et al. 2016.

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Appendix 1: Examined court decisions

Hof Den Haag 2 October 2001, ECLI:NL:GHSGR:2001:AD5053
HR 9 September 2003, ECLI:NL:HR:2003:AF8779
Rb. Maastricht 13 October 2006, ECLI:NL:RBMAA:2006:AZ1481
Rb. Rotterdam December 19, 2006, ECLI:NL:RBROT:2006:AZ8683
HR December 11, 2007, ECLI:NL:HR:2007:BB7127
Rb. Den Bosch 24 December 2007, ECLI:NL:RBSHE:2007:BC1054
Rb. Amsterdam February 29, 2008, ECLI:NL:RBAMS:2008:BR2538
Rb. Amsterdam February 29, 2008, ECLI:NL:RBAMS:2008:BR2556
Rb. Zwolle-Lelystad 27 March 2008, ECLI:NL:RBZLY:2008:BC8227
Rb. Haarlem 12 June 2008, ECLI:NL:RBHAA:2008:BD4753
Hof Den Bosch 5 December 2008, ECLI:NL:GHSHE:2008:BG8081
Rb. Amsterdam February 4, 2009, ECLI:NL:RBAMS:2009:BH1786
Rb. Maastricht 8 April 2009, ECLI:NL:RBMAA:2009:BI0654
Hof Arnhem 8 September 2009, ECLI:NL:GHARN:2009:BJ7123
Rb. Alkmaar 22 December 2009, ECLI:RBALK:2009:BK7362
Hof Amsterdam 2 April 2010, ECLI:NL:GHAMS:2010:BL9992
HR 8 February 2011, ECLI:NL:HR:2011:BP3520
HR 22 March 2011, ECLI:NL:HR:2011:BO2958
Conclusie Advocaat Generaal June 28, 2011, ECLI:NL:PHR:2011:BQ0049
Rb. Amsterdam 17 November 2011, ECLI:NL:RBAMS:2011:BU5091
Hof Den Haag 21 February 2013, ECLI:NL:GHDHA:2013:BZ1878
Rb. Amsterdam 29 April 2013, ECLI:NL:RBAMS:2013:BZ9194
Rb. Amsterdam 9 May 2013, ECLI:NL:RBAMS:2013:5555
Rb. Rotterdam July 8, 2014, ECLI:NL:RBROT:2014:6693
Hof Arnhem-Leeuwarden November 19, 2014, ECLI:NL:GHARL:2014:8931
Rb. Noord Nederland 11 December 2014, ECLI:NL:RBNNE:2014:6510
Rb. Den Haag 29 January 2015, ECLI:NL:RBDHA:2015:901
Gemeenschappelijk Hof van Justitie 4 February 2015, ECLI:NL:OGHACMB:2015:5
Rb. The Hague 27 February 2015, ECLI:NL:RBDHA:2015:1884
Hof Den Bosch 5 June 2015, ECLI:NL:GHSHE:2015:2038
Rb. Amsterdam October 1, 2015, ECLI:NL:RBAMS:2015:6671
Rb. The Hague 5 November 2015, ECLI:NL:RBDHA:2015:15101
Rb. Rotterdam December 1, 2015, ECLI:NL:RBROT:2015:8781
Rb. Amsterdam 9 December 2015, ECLI:NL:RBAMS:2015:8875
Rb. Oost Brabant 12 February 2016, ECLI:NL:RBOBR:2016:554
Rb. Amsterdam 26 April 2016, ECLI:NL:RBAMS:2016:2720
Hof Amsterdam 9 May 2016, ECLI:NL:GHAMS:2016:1774
Conclusie Advocaat Generaal 17 May 2016, ECLI:NL:PHR:2016:578
Rb. Oost Brabant 14 June 2016, ECLI:NL:RBOBR:2016:3718
Hof Den Bosch 1 July 2016, ECLI:NL:GHSHE:2016:2684
Rb. Limburg 4 July 2016, ECLI:NL:RBLIM:2016:5715
Rb. Den Haag 28 July 2016, ECLI:NL:RBDHA:2016:8679