

INTERNATIONAL ASSOCIATION FOR IDENTIFICATION

FORENSIC PODIATRY: ROLE AND SCOPE OF PRACTICE

(IN THE CONTEXT OF FORENSIC HUMAN
IDENTIFICATION)

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FORENSIC PODIATRY: ROLE AND SCOPE OF PRACTICE

Forensic podiatry – definition

Forensic podiatry has been defined as "the application of sound and researched podiatry knowledge and experience in forensic investigations, to show the association of an individual with a scene of crime, or to answer any other legal question concerned with the foot or footwear that requires knowledge of the functioning foot"¹. (Vernon, McCourt, 1999).

This definition strictly covers all legal applications of podiatric expertise, however in the context of the IAI, only those aspects of the definition which relate to forensic human identification are relevant. The role and scope of practice of forensic podiatrists of interest to the IAI arise directly from the definition itself and in this sense, the following key components of the definition are relevant:

- 1) That the podiatry knowledge and experience used in forensic podiatry practice should **be sound and researched**.
- 2) That the work of forensic podiatrists is concerned directly with those aspects of the foot or footwear that require **knowledge of the functioning foot**².

The training and education of forensic podiatrists

In many countries, podiatry is a protected title, meaning that only those who have undertaken an accepted qualification in the country of their practice can call themselves podiatrists. This will usually mean that a podiatrist is qualified to degree level, with a Bachelor of Science (BSc) degree in podiatry, or equivalent. In the US, podiatrists must hold the degree of Doctor of Podiatric Medicine (DPM). Many countries have reciprocal arrangements in which each others qualifications are

¹ Vernon D.W., McCourt F.J., "Forensic podiatry – a review and definition", British Journal of Podiatry, Vol. 2, No. 2, May 1999, p. 45 – 48.

² It is however important to note that in terms of function, the foot cannot be considered in isolation, but instead is the end consideration of a chain of events occurring in human locomotion. As such, considerations of the functioning foot will encompass motional considerations of the lower limb occurring prior to their manifestation in the foot itself.

recognized, allowing podiatrists to practice in the countries which are party to those arrangements.

Podiatrists who practice forensically must firstly, by definition have a qualification allowing them to practice as a podiatrist. Next, they must be in a position to show such development as would allow them to practice competently in a medico-legal context. There is more than one route to developing this level of expertise, which may include:

- Negotiated Masters Degree programmes enabling the person to gain a Masters degree relevant to/majoring in forensic podiatry.
- Forensic science degree programmes at Masters and Bachelor of Science degree levels.
- Post graduate Diploma programmes (e.g. Society of Apothecaries Diploma in Forensic Human Identification, Staffordshire University Diagnostic and Therapeutic Footwear Diploma).
- Expert witness training programmes (e.g. the UK-based Bond Solon course)
- Forensic podiatry (or related³) training workshops and/or seminars.
- Research activity in areas relevant to forensic podiatry.
- Relevant continuing professional development (CPD) activity (including publication, presentation, conference/seminar attendance, etc).

This position is similar to other forensic science/practitioner training in which the person has a degree or higher degree in a specific area of expertise (e.g. chemistry, biology, medicine), then subsequently learns how this knowledge is applied in a forensic context. A typical route towards development has three dimensions and would be as follows:

- 1) Initial gaining of qualification as a podiatrist

³“Related” training workshops/seminars in this sense would be strictly limited to training which covers subjects which would give contextual awareness and would not be used in a forensic podiatry context to extend practice into that area. For example this training may include that which covers what accidental wear marks are and what the footwear / marks examiner undertakes in this area of work.

- 2) Gaining post graduate knowledge of specific relevance to the practice of forensic podiatry. This could include M-level study in areas relevant to forensic podiatry practice, forensic science/forensic identification study covering forensic practice and its requirements, or through research, or demonstrable experience.
- 3) Becoming competent as a forensic practitioner. In practical terms, this can be developed in several ways (or through a combination of approaches) which would include:
 - Aspects of Forensic science/forensic identification study, especially where portfolio-based learning requires training and reflective development in the area of expertise concerned.
 - Repeated attendance at workshop, seminar, or conference-based training events.
 - Where the podiatrist is intending to become involved in work involving physical match comparison (particularly in relation to morphological barefoot impression comparisons or the interpretation of pathologies from outsole wear patterns in crime scene impression), short course attendance in comparative analysis training is desirable.
 - Formal expert witness course training.
 - Assessed mock case working.
 - Acting as a supervised assistant to another forensic podiatrist during their case work.
 - Regular mentorship from a competent forensic practitioner.

It is important to note that in some countries, beyond the person holding relevant basic qualifications, the ability to practice competently is not evaluated by considering their route to training, but is instead is focused on an assessment of their outputs, in recognition of the many diverse routes to achieving competency that are now available. From the position of the IAI, this suggests that the development of a

certification programme in the forensic podiatry discipline in the near future would be advantageous.

It is inconceivable that the final phase of training as a forensic podiatrist could be completed in less than 12 months, even assuming that a regular and sustained approach has been applied to that development. A podiatrist wishing to develop an expertise in forensic podiatry would be advised to maintain a reflective learning diary throughout their training and beyond.

Role and scope of practice

Forensic podiatry currently has four sub-specialties covering analysis and identification involving:

- Podiatry treatment records
- Bare footprints
- Footwear
- Forensic Gait Analysis

Podiatry treatment records

Podiatrists' clinical records can be used in the identification of deceased persons. While the techniques involved could be of use in the identification of any deceased person who has previously received podiatry treatment, they can be of particular use when the lower limb has been separated from the body, or when other features of the body have been subject to widespread trauma thereby compromising other methods of identification. This work would be carried out at the request of forensic pathologists, police agencies, mass disaster agencies (e.g. Kenyons), International Identification Agencies (e.g. CIFA) and other professional groups working in the field (e.g. Forensic Anthropologists). Because of the professional language, coding systems and podiatric conditions involved, this work would be the exclusive domain of the podiatry profession.

The records made by podiatrists contain the following information⁴:

Personal information (name, address, contact details)

Relevant medical history

Foot type (e.g. pes planus, pes cavus)

Foot-related pathologies present – functional (e.g. forefoot varus), structural (e.g. hammer toes, hallux valgus) and superficial (e.g. sites of corns and callus)

Treatments carried by the podiatrist

It is this particular information which is used by podiatrists in the identification of an unknown deceased person from their podiatry records.

Tasks involved:

The tasks involved in podiatry identification from treatment records are as follows:

- To maintain the chain of custody at all times.
- Taking routine precautions in the handling of biological/hazardous waste
- Compliance with local mortuary procedures as required.
- Translation of clinical codings present on ante-mortem records.
- Assessment and recording of features listed in ante-mortem records.
- Assessment and recording of features of podiatric relevance present on the feet of an unidentified deceased person.
- Taking of X-ray and other diagnostic images of post mortem feet as required.
- Photography of features of post mortem feet as required.
- The management of digital images captured in the assessment process.
- Comparison of ante-mortem and post mortem data from above assessment process.

⁴ Doney I. E., Harris P.H.G., "Mass disaster identification. Can chiropodists help?", *The Police Surgeon*, Vol. 25, 1984, p. 14-20.

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Vernon W., "The Development and Practice of Forensic Podiatry", *Journal of Clinical Forensic Medicine*, October 2006, p. 284-7.

- Evaluation of the significance of matched and mismatched features apparent from the above comparison process with reference to established literature and/or database material as appropriate.
- Report compilation.
- Report verification by a peer podiatric examiner.

Barefoot prints

Barefoot prints can be associated with scenes of crime creating the potential to link such footprints with the perpetrator of that crime. This area of forensic identification has multidisciplinary potential, bringing with it the possibility of using footprint ridge detail and the straightforward consideration of the outline footprint morphology in the identification process. This work would be carried out at the request of marks examiners and other professional groups working in the field (e.g. friction ridge detail analysts, forensic anthropologists), police agencies, and lawyers. Other disciplines involved in footprint identification may include:

- Friction ridge detail analysts for the consideration of friction ridge detail and other relevant skin features (e.g. crease lines), where apparent.
- Footwear examiners with enhanced expertise⁵ in the basic morphological assessment of footprints in the absence of comparison process.
- Forensic anthropologists with expertise in relating structural dimensions of the foot to the body frame.

Podiatrists' involvement in barefoot identification is both descriptive and interpretative. The particular emphasis is on the recognition and utilization of foot-related conditions and foot dimensions in this process. As podiatrists recognize a condition, state or pathology in an unknown barefoot print, this would then be described and compared with the recognized presence or absence of such a condition, state or pathology in a known barefoot print .

⁵ Such enhanced expertise would as a minimum include training, practice and experience in footprint collection and techniques of analysis, the study of foot anatomy and related terminology, population variations of a pathological or structural nature and the study of the functional formation of footprints. This could also include expertise derived through research activity in the field of footprint collection and analysis.

Tasks involved:

The tasks involved in the podiatric assessment of footprints are as follows:

- To maintain the chain of custody at all times.
- The capture of evidence quality digital images of footprints.
- Taking of X-ray and other diagnostic images of the feet of examined persons as required.
- Photography of features of the feet of associated persons as required.
- The digital management of footprint images in order to produce scale evidence quality images for analysis and comparison.
- The collection of exemplar footprints from a person suspected of being responsible for the formation of a questioned footprint, or who is to be eliminated from the enquiry.
- The observation of exemplar footprint collection in order to identify variable factors which may affect repeatability.
- The examination and recognition of foot-related conditions of known persons.
- The description and comparison of the physical dimensions of footprint morphology.
- The comparison of dimensional and interpretive aspects of known and unknown footprints.
- The estimation of foot length and required shoe size from a footprint.
- The recognition of foot pathologies or specific characteristics of the foot from the footprint.
- The recognition of functional factors involved in the formation of a particular footprint.
- The evaluation of the significance of matched and mismatched dimensional and interpretive features apparent from the above comparison process with reference to established literature and/or database material as appropriate.
- The consideration and where apparent, the explanation of differences apparent between compared known and unknown footprints.
- Evaluation of the significance of matched and mismatched features apparent from the above comparison process with reference to established literature and/or database material as appropriate.

- Report compilation.
- Report verification by a peer podiatric examiner.

Footwear

Footwear can be associated with scenes of crime in a number of ways. Primarily, it is widely considered that “since criminals must enter and exit crime scene areas, it should be reasonably assumed that they would leave traces of their footwear”⁶. This leaves the potential for a shoeprint to be matched with the shoe responsible for leaving that print as a means of identification. A shoe can also be linked to a crime scene through the presence of trace evidence associated with the crime scene being found on that shoe (e.g. DNA, fibres etc). Additionally, there may be the additional task of linking a shoe to a known person as well as linking the shoe to the crime scene, especially in the case of denied ownership of a shoe. This is a multidisciplinary area in which various forensic specialties contribute. The podiatrists particular role would, however be limited to the following:

- Interpreting functional pathologies of the foot and gait, (including shoe fitting issues) which may be manifesting in outsole wear patterns⁷ and relating these to functional pathologies of the foot and gait.
- The assessment of those wear features which relate to function and fit of the shoe to establish links between a known person and the shoe, or between different footwear items (known and unknown).
- The assessment of the various wear features which relate to function and fit of the shoe in order address questions relating to possible multiple wearers.

This work would be carried out at the request of marks examiners and other professional groups working in the field (e.g. forensic anthropologists), police agencies, and lawyers.

⁶ Hilderbrand D.S., Footwear, the missed evidence: A field guide to the collection and preservation of forensic footwear impression evidence, (Temecula: Staggs), 1999, p. 3-4.

⁷ Outsole wear patterns are those patterns of outsole wear formed through walking or other occupational activity. These patterns are class as opposed to identifying characteristics and because of the many variables potentially influencing the form of these patterns, they should be treated cautiously in the identification process.

Tasks involved:

- To maintain the chain of custody at all times.
- Initial risk assessment of footwear to determine the appropriate precautions to be taken during the examination.
- The adoption of safe governance approaches as determined through the above.
- The initial digital image capture of footwear under consideration.
- Preliminary assessment of footwear to ascertain benefits of proceeding with the examination.
- The opening of footwear to investigate and display internal wear features.
- The capture of evidence quality digital images of the foot impression apparent on the insole/sock liner of the shoe.
- The digital management of footwear images in order to produce scale evidence quality images for analysis and comparison.
- Taking of X-ray and other diagnostic images of the feet of examined persons as required.
- Photography of features of the feet of associated persons as required
- The collection of exemplar footprints (if deemed necessary) from a person suspected of having worn a questioned footwear item, or who is to be eliminated from the enquiry.
- The observation of exemplar footprint collection in order to appreciate variable factors which may affect repeatability.
- The verification of internal size dimensions of the shoe.
- The examination and recognition of foot-related conditions and dimensional aspects of the feet of known persons who may have worn the shoes.
- The recognition and description of wear features of the inner, upper and outsole aspects of the shoes.
- The comparison of the physical dimensions of known and unknown feet and footwear examined.
- The comparison of wear features present within/on known and unknown feet and footwear examined.
- The comparison of foot impression dimensions and features between known and unknown shoes.

- Comparison of known and questioned footprint data from the above assessment process.
- The estimation of foot length and required shoe size from a footprint.
- The recognition of foot pathologies or specific characteristics of the foot from the wear features of the examined shoes.
- The recognition of functional factors involved in the formation of a particular wear features of the examined shoes.
- The evaluation of the fitting match between feet and shoes in known and unknown footwear examined.
- The evaluation of the significance of matched and mismatched dimensional and interpretive features apparent from the above comparison process with reference to established literature and/or database material as appropriate.
- The consideration and where apparent, the explanation of differences apparent between compared known and unknown footwear items and feet examined.
- Report compilation.
- Report verification by a peer podiatric examiner.

Forensic Gait Analysis

Forensic Gait Analysis is defined as: the identification⁸ of a person or persons by their gait or features of their gait, usually from CCTV footage and in comparison to footage of a known individual⁹. Where the perpetrators of crime have been captured on CCTV, the persons gait and/or features of gait can assist in the subsequent identification process. Such gaits and features are identified on CCTV footage and compared to video or other recorded footage of a known person.

This work is currently the exclusive domain of forensic podiatrists¹⁰. Although electronic/computing engineers are working on biometric systems in this same area, these are still under development and are not in practical use to date. The work is usually carried out at the request of police agencies or lawyers.

⁸ Identification in this context is used in the common sense of the meaning, namely that defined in the Oxford English Dictionary as 'sharing characteristics with another person'.

⁹ Kelly H., Old Bailey Central Criminal Court, London. R- v -Saunders, July 2000.

¹⁰ While other medical disciplines have background knowledge in this area, to date, this has not developed further in a forensic context

Tasks involved:

- To maintain the chain of custody at all times.
- Selection of suitable equipment in order that a detailed analysis of the footage can be performed.
- When relevant, instructing police agencies/lawyers in the forensic gait analysis requirements for the collection of any additional footage from known persons suspected of being present in the questioned footage, or who is/are to be eliminated from the enquiry.
- Preliminary assessment of footage under consideration, to determine whether the material is of sufficient quality to proceed and whether any meaningful analysis of the material is possible in a forensic context.
- Performing an in-depth assessment of the footage with observational recordings being made, to include appropriate qualitative and quantitative analysis.
- Comparison of the footage of unknown and known persons.
- Evaluation of the significance and use of scale/s of support for matched and unmatched features apparent from the above comparison process, with reference to established literature, clinical data, or database material as appropriate.
- The consideration and where apparent, the explanation of differences observable between the compared unknown and known footage.
- Where necessary, observational population data collection for comparative purposes.
- Report compilation.
- Report verification by a peer forensic examiner.¹¹

¹¹ Although not all countries require verification of this work.

Comment on what is not included under the role and scope of practice of forensic podiatry

Because many of the areas of forensic podiatry practice closely relate to the forensic practice of other disciplines, for reasons of clarity, it is useful to state what isn't included in forensic podiatry practice¹². These considerations would not preclude podiatrists practising in these areas subject to receipt of training accepted as full and proper by a responsible body of practitioners skilled in each the relevant specialist area. Areas outside the role and scope of practice of forensic podiatrists without such additional training are as follows:

Recovery of evidence from crime scenes

It would not be usual for a forensic podiatrist to recover evidence from the scene of a crime (but see footnote13). This process requires extensive training in a breadth of forensic skills and is usually the specialist role of Scene of Crime Officers, (SOCOs), in the United Kingdom and Crime Scene Investigators (CSIs) in the United States of America. The discovery and recovery of information that is of interest to a forensic podiatrist must be undertaken without jeopardizing any other types of evidence that may be present at the scene. Specialist advice may however be requested from a forensic podiatrist by such crime scene specialists to aid them in their work.

Bare footprints

If ridge detail (finger print type lines) is apparent in a bare footprint it should be referred to a finger print examiner for analysis. The use of ridge detail to link a suspect with a bare footprint is not within the scope of practice of a forensic podiatrist. Any podiatrist wishing to undertake such work needs to undergo the training required of specialists in this area.

Footwear

¹² It is important to note that there are international variations here. For example, in some countries, podiatrists have been required to attend scenes of crime, whereas in others, this does not occur within the norms of investigation.

Outsole patterns Outsole patterns (as opposed to outsole wear patterns) are the design or pattern on the underneath of the sole of the shoe. These patterns are produced during the manufacturing process and are often used to identify the type and size of shoe responsible for leaving a shoe print or shoe impression at the scene of a crime. The identification of footwear type and size is the role of the marks examiner in the United Kingdom and of the Footwear Examiner in the United States of America. Podiatrists wishing to undertake this type of comparison are required to undertake the training required to become a marks examiner/certified footwear examiner¹³.

Manufacturing characteristics/abnormalities Manufacturing characteristics/abnormalities are those features of manufacture, which can provide class level features of assistance in the comparison process of shoes. They would include features such as repeatable damage from a mold, bubbles caused by the molding process and differences caused by the cutting out of material from which the outsole is manufactured in different positions. The comparison of these characteristics is the role of the marks examiner in the United Kingdom and of the footwear examiner in the United States of America. Podiatrists wishing to undertake this type of comparison are required to undertake the training required to become a marks examiner / certified footwear examiner.

Outsole wear marks (accidentals) Wear marks or accidentals are typically the products of damage on the shoe outsole. They can include damage incurred as a result of events such as standing on a sharp object, peripheral aspects of wear features of the outsole, trapped debris and Schallamach patterns, all of which are considered unique and which may be present on the outsole. Identification from wear marks of footwear is the role of the marks examiner in the United Kingdom and of the footwear examiner in the United States of America. Podiatrists wishing to undertake this type of comparison are required to undertake the training required to become a marks examiner / certified footwear examiner.

¹³ However it is often possible to note a marked brand of shoe by simple label recognition, which will not require specialist knowledge. Where it is essential to separate counterfeit from genuine brands, such specialised knowledge will still be required and is beyond the remit of the forensic podiatrist.

Forensic Gait Analysis

It would not be usual for a forensic podiatrist to comment upon matters outside their area of expertise in which they have received no training or had relevant experience. Comments should be confined to the gait (which is the style or manner in which a person walks) and/or features of a persons gait. An understanding of the factors which may affect a persons gait is of course required and such as may be discussed when giving oral evidence in court. However this should not extend to include reference to specific clothing characteristics nor visual height estimations of a person as these may be deemed outside the forensic podiatrist's area of expertise.

Future developments

It is likely that this role and scope of practice will evolve over time as techniques improve and research developments are implemented in practice. While it is impossible to state exactly what these changes will be, all new directions for the role and scope of practice of forensic podiatrists should be encompassed by the "umbrella" definition of forensic podiatry, as stated at the beginning of this document.

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