THE MISSING PIECE

Forensic podology has played a vital role in criminal investigations for more than a century. The development of its first code of practice signals a big step forward for this highly specialised branch of podiatry.

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Images: Spooky Pooka

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A footprint in blood. Footwear linked to the scene of a crime. The unique wear pattern a foot makes inside a shoe, which shows who regularly wears it. When we think of forensic evidence, DNA and fingerprints may first come to mind, but findings provided by specialist forensic podiatrists can be just as critical in criminal cases. These experts use their 'podiatry knowledge and experience in forensic investigations to consider the association of a person with a scene of crime' (Vernon and McCourt, 1999).

This is not an entirely new field. Canadian practitioner Dr Norman Gunn was the first modern podiatrist to get involved in forensic casework in the early 1970s, while foot-related evidence has been heard in court cases since at least 1862 (Ansert et al, 2017). However, until recently there has been little statutory regulation in this area. The Forensic Podology Code of Practice, developed by members of RCPod, seeks to address this.

Those involved in this area explain the challenges of their work, memorable cases, and why standardising the profession is the foundation on which future innovation is built.

Investigating crimes

Forensic podiatry is split into two disciplines. Forensic gait analysis deals with the comparison and evaluation of gait features to assist investigations into crime. Practitioners examine CCTV images provided by the police and compare this with other footage of a person of interest. By contrast, forensic podology entails examining footprints and footwear, and using podiatry records to assist the criminal justice system.

Dr Sarah Reel is a specialist in forensic podology and acting head of RCPod's Forensic Podiatry Special Advisory Group (FPSAG). A typical case for her, she says, 'would be where the perpetrator has left shoe print evidence, which can be linked to a specific shoe being worn by the suspect at the time of arrest. The suspect may deny the long-term ownership of the shoes they're wearing – they might say they bought them off eBay and they have just arrived.

'It's the job of the forensic podologist to examine the shoes that we know belong to the suspect, and to compare these findings with those from the shoe linked to the crime.'

Sarah will then write a report on her findings and conclude, on the balance of the evidence examined, how likely it is that the suspect was the person wearing the shoe. She may be asked to appear in court as an expert witness to be questioned on the findings.

Sarah was part of the writing group that has developed the new guidance document. She explains: 'The FPSAG realised the importance for those working in criminal casework to be able to show they were competent as forensic podiatrists in a court of law. There were standards to adhere to but we didn't have any established standards [of our own].'

In 2017, the Forensic Science Regulator tasked the FPSAG with writing two sets of standards. The first, for forensic gait analysis, was published in 2019. Now, with the second in forensic podology finished and due to be published next spring, this work lays a clear foundation for those working in the field, both present and future.

'It isn't enough to just be an experienced podiatrist: successful practitioners in forensics also need a solid understanding of the law and their area of expertise'

Professor Wesley Vernon

At a glance: Forensic Podology Code of Practice

This guidance document is due to be published next spring.

Authored by members of RCPod and the Chartered Society of Forensic Sciences, it has been produced to help forensic podiatrists adhere to the Forensic Science Regulator's code of practice. It also aligns with HCPC standards of conduct, performance and ethics for podiatrists working in this area.

Laying out best practice advice for casework, from initial enquiry through to preparation and presentation of materials for court, it 'aims to reduce the potential for any miscarriages of justice by providing guidance to forensic podology practitioners', says Dr Sarah Reel. 'It's also a good starting point for anyone interested in this area to find out what's involved.'

The guidance is likely to cover:

- Accounting for bias.
- Standard operating procedures and document control.
- Validation of methods.
- Keeping good records.
- Peer review of every case.
- Presentation of evidence.
- Practical sections on the processes of footprint examination and feet-in-shoes examination.

A different set of rules

Professor Wesley Vernon OBE is sometimes described as the godfather of forensic podiatry. He became a pioneer in the field after taking his first case in 1995 and setting up Sheffield Teaching Hospital's renowned forensic podiatry unit. The service, which he ran for many years with podiatrist Jeremy Walker, brings together those working in this area to undertake and publish research, and carry out national and international casework.

Wesley says it isn't enough to just be an experienced podiatrist: successful practitioners in forensics also need a solid understanding of the law and their area of expertise. 'To use an analogy of Jeremy's, you might be a very good rugby player, but you don't just go onto a football pitch, pick up the football and start running with it.

'It's an entirely different area of practice with an entirely different set of rules. If that's not understood, you could run into problems very quickly. You could discredit yourself and potentially discredit the whole discipline.'

That means being clear from the outset what the role and scope of practice includes. Professor Ivan Birch is a full-time forensic gait analyst who spent years teaching biomechanics and physiology to podiatrists. He says it's important for practitioners to understand the difference between their role as healthcare professionals and as expert witnesses.

'A podiatrist brings a theoretical and an experiential advantage to the field through their detailed and thorough understanding of the normal structure and function of the human foot and gait. This is gained through their caseload and professional practice. However, they are trained to bring evidence together to make a diagnosis. In forensics, it's almost the opposite: you're not narrowing the field, you're widening it.

'People often think it's their job to identify a person, but the role of an expert witness is to provide an unbiased assessment of what they have seen. I've had cases where we have analysed two pieces of footage where there are great similarities between them, but it turns out not to be the same person.'

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How to become a forensic podiatrist

After qualifying as a podiatrist:

1 Develop postgraduate knowledge of forensic gait analysis or podology. This could be through a master's degree in forensics or research, or demonstrable experience.

2 Become competent as a forensic practitioner by:

- Studying forensic science or forensic identification.
- Attending workshops, seminars and conferences.
- Taking courses in comparative analysis and formal expert witness training.
- Assessed mock case working.
- Acting as a supervised assistant to another forensic podiatrist during their casework.
- Regular mentorship from a competent forensic practitioner.

3 Stay current and competent through continuing professional development.

Interested RCPod members can join the FPSAG by emailing **s.m.reel@hud.ac.uk**

One piece of the jigsaw

Ivan led the development of the Sheffield Features of Gait Tool, a validated methodology widely used nationally and internationally, which uses more than 130 different features of gait variance to assist with gait analysis. But while it provides a consistent approach to the practice, the forensic process is complex and multifaceted.

Nadia Ásgeirsdóttir is a forensic scientist working with Ivan at his practice, Forensic Gait Analysis Services. She explains: 'When analysing and comparing different video footage, you have to keep in mind any limitations before you make your final conclusions. There's a lot that can affect a person's gait and the way they might show up on camera, including the ground surface, if they're walking around objects or other people, what they're wearing, and so on.

'Forensic podiatry alone cannot precisely identify a single individual within a population. It's one piece of the jigsaw of evidence presented in a case.'

On the stand

Working within the criminal justice system presents several challenges. For a start, as an expert witness you have a duty to the court above all else. Apart from being required to provide a report or attend a hearing at the last minute, impartiality is key.

'I absolutely hated appearing in court,' Wesley says. Despite all the high-pressure work he did as a podiatrist in practice, appearing in court was a different level of intensity.

'Cross-examining barristers have two main strategies,' he continues. 'The first is to invite you to step outside of your sphere of knowledge. If you do that, you're in trouble. The second is to tighten that sphere, so you can't get across just how much you know about the subject. They also look for any opportunity to cast doubt on your credibility.'

Staying up to date with relevant research in your own subject and the law can go a long way to preparing a podiatrist to take the stand, together with undergoing specialist training and peer support (see *How to become a forensic podiatrist*, left).

Nadia adds that being clear about the role is also vital: 'Once I've finished my report and I go to court, I approach it like my job is already done. I'm only there to explain how I came to my conclusion. It's not my job to convince anybody. That's for the barrister.'

Weighing the evidence

The number of requests for help from podiatrists with casework has increased from around two a year in the mid-1990s to around two a week today, according to Wesley and Ivan. With this, governance has grown tighter and more standardised practices have been developed. 'I feel very proud to have been involved with the development of the Forensic Podology Code of Practice, which took five years to complete,' Sarah says. 'The writing group was spearheaded by members of the FPSAG, working with forensic scientists and members of the Chartered Society of Forensic Sciences. This turned out to be a great working collaboration.

'The additional contribution and support from forensic science professionals in completing the code of practice has ensured forensic podology case work will be more standardised, and it also provides a structured pathway for those coming into the profession.'

Research is also ongoing in other areas to find new and better ways to analyse data. For example, Ivan has been working with statisticians on a project funded by the Alan Turing Institute to produce a likelihood ratio for forensic gait analysis. This aims to help forensic specialists to decide how much weight the judge or jury should place on their evidence.

Ivan says: 'Our next step is to put our findings into a format that can be easily used by a practitioner. If we can get it to work, it could help to solve a problem that's fundamental to all forensic disciplines.'

AI and machine learning could also have an important part to play in future practice. Sarah was involved with research that used AI to assess whether a footprint belonged to a male or female suspect (Budka et al, 2021). 'The model got around 90% accuracy, which is better than an expert can achieve,' she says. 'I think any science would be remiss in not taking AI very seriously.'

The discipline of forensic podiatry will continue to expand as those involved continue to innovate. Sarah says she is hopeful that more police forces will begin to understand the role forensic podiatrists play in convicting those who commit crime – and think they will get away with it.

CASE FILE

In 2018, a woman was given a life sentence after being found guilty of stabbing her step-grandfather more than 120 times at his home in Doncaster.

Dr Sarah Reel, who worked as part of Sheffield's forensic podiatry unit with Professor Wesley Vernon OBE and Jeremy Walker, was asked to analyse footprints left at the scene of the crime.

She explains: 'Bloody footprints photographed by the crime scene investigators were sent to the Sheffield team, along with some inked footprints that were taken from a female suspect at a police station. Jeremy, acting as our preliminary assessor for the case, passed this material evidence on me to analyse, compare and examine, minus superfluous contextual details, so I was blind to bias.

'Both the crime scene footprints and the inked footprints from the suspect showed many comparable features in shape and size. But significantly, both sets of footprints showed a relatively unusual spacing between the third and the fourth toe print.

'When I looked at our database of nearly 3,500 footprints, only four had this particular feature. I then examined the photographs of the suspect's feet taken at the police station, and it was apparent that the suspect had bilateral syndactyly. This fitted in with the toe print pattern that I was looking at. According to research at that time, syndactyly was thought to only occur once in every 2000 to 3000 live births.

'I concluded in my report that there was moderately strong support that the crime scene footprints and the inked footprints taken from the suspect belonged to the same person. The defendant, when confronted with my report, agreed with it and eventually pleaded guilty.'

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