A Year At the Cutting Edge – Sophie Stanley

In August 2015, I received £2,100 from the Association of Clinical Pathologists Student Research Fund enabling me to undertake an intercalated BSc in medical research at the University of Leicester. My intercalated degree took the format of an independent research project culminating in a dissertation. This was a fantastic opportunity to understand first-hand the challenges and rewards of managing a project and to gain a unique insight into the world of research.

Spending a year inflicting and observing stab wounds in sections of pork is an unusual and somewhat gruesome way to obtain a degree. However, the forensic pathology basis of my project was what initially attracted me as it would allow me to explore a speciality that is not traditionally taught in the medical curriculum. With stabbing being the most common method of homicide in the UK and knife crime becoming ever more reported in the news, the relevance and application of any potential findings additionally inspired me to investigate this area further.

The aim of my research project was to determine whether stab wounds from a serrated blade could be distinguished from those made with a flat blade after tissue had undergone taphonomic processes. Taphonomy refers to events that happen to organisms after death. In the case of my project, this meant studying decomposed, burnt, mummified and waterlogged stab wounds. I also aimed to establish the best way to image these wounds so that, if applied to a real forensic case, evidence could be collected for use in a court setting.

I answered my research question experimentally by simulating stab wounds in porcine skin and then subjecting them to taphonomic processes. Determining a method formed a large part of my project as I was also required to perform a pilot study to assess the viability of the imaging techniques to be used. These were photography, stereo-optical microscopy and micro-computed tomography (micro-CT). I learnt to use highly specialised equipment that has only recently been introduced into forensic pathology (micro-CT). Micro-CT was used to create a 3D virtual model of the stab wounds. It has previously been used to image injuries in bone, most notably in the investigation of the skeleton of King Richard III at the University of Leicester.

I particularly enjoyed the method development phase of my project because of the analytical skills required to identify potential problems and the creativity associated with then solving them. The diversity of my project meant I learnt a significant range of skills, including tissue handling and chemical protocols; applying statistical techniques; and using imaging equipment and processing software.

My research found that serrated blade wounds could be distinguished to some extent in taphonomically altered tissues; however, the consistency of this was dependent on the taphonomic process and type of knife used (e.g. coarse or fine serrations). The best imaging technique was stereo-optical microscopy although photography was also effective. This was an interesting result because the techniques identified were cheap, easy to use and accessible, meaning that their application in practice could potentially occur more readily. Although there are limitations to my findings, for example the use of a porcine analogue and the artificial recreation of stabbing and taphonomic events, they can still be applied to current forensic practice. The results validate and provide a protocol to image stab wounds along with providing evidence that serrated blade wounds can be distinguished in taphonomically altered skin.

Due to my findings, I have been able to present my work at national and international conferences both orally and in poster format. I hope to further communicate my work through publication in a scientific journal over the next year. Attending the conferences was a fantastic experience that allowed me to travel abroad and network with other researchers. This provided me with feedback on my work and an insight into future developments of the specialty.

I chose to intercalate because I wanted to experience research and determine whether it would be something
I would be interested to pursue in the future. I also saw intercalating as an opportunity to develop professionally through learning new and transferable skills. The intercalation year has certainly allowed me to do this in addition to giving me the confidence to know that I can independently undertake my own research project.

This year has inspired me to become involved in research in the future, potentially through the Academic Foundation Programme, and also to consider a future career in pathology. By working in the forensic department for a year, I was able to experience the specialty which included observing autopsies and attending a trial. My involvement in research has given me an insight into potential future directions that the forensics specialty may take, e.g. an increased use of post-mortem imaging. This year has given me a focus for the remainder of my medical course to develop a profile to support these future career ambitions.

By intercalating between 3rd and 4th year, I have been able to develop personally without the demands of medical placements and examinations. Some additional projects I have become involved in during the year have been to write articles for the university medical students’ magazine, teach revision sessions to more junior medical students, gain work experience in two medical specialties (forensic pathology and emergency medicine), and to discover a new personal interest (mountaineering). Through these experiences I have been able to improve the diversity of my skill set whilst also enjoying the challenge of working with new people in different, including non-medical, environments. Undertaking an intercalated BSc in research is certainly not for everyone; however, the personal development and enjoyment I have gained from this year means that I would certainly encourage anyone to consider it.

My enjoyment of this year has been made possible by the generous funding provided by the ACP and the people that have supported me along the way. I would therefore particularly like to thank the ACP; my supervisors (Professors Guy Rutty and Sarah Hainsworth); the staff at the East Midlands Forensic Pathology Unit and the University of Leicester Department of Engineering; and my research partner (Tom Calderbank). From the microscopic analysis of knife blades to an insight into the forefront of forensic research, my year has truly been spent at the cutting edge!