



BRITISH ASSOCIATION OF DERMATOLOGISTS ELECTIVE PRIZE/PROJECT GRANT REPORT – SUMMER 2021

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ACKNOWLEDGEMENTS

Firstly, I would like to express my gratitude for the BAD Elective Prize/Project Grant, which was integral in funding my placement at St John's Institute of Dermatology, situated in Guy's hospital. I would also like to thank Dr Lynch and the dermatology team at Guy's hospital who guided me and kindly supervised my project. It has been an incredible experience.

INTRODUCTION

During my final year at university I arranged to undertake a 2-week clinical placement at Guy's and St Thomas' hospital (Figure 1) in June. I had an interest in dermatology at medical school and I wanted to explore it further during my elective to not only gain hands-on experience in the speciality, but to also improve my knowledge of both rare and common dermatological conditions.



Figure 1: Guy's Hospital, London.

CLINICAL EXPERIENCE

The primary objective for this elective was to improve my confidence in diagnosing and managing common skin disorders, which I achieved through taking histories and examining patients at the clinical fellow-led clinics. This task proved to be challenging at times, especially if the patient was presenting with rare signs or symptoms. However, I found that with practice and feedback from seniors, my clinical skills improved drastically. This highlighted the importance of taking detailed histories and formulating structured treatment plans. Shadowing the on-call team at St Thomas' hospital also allowed me to contextualise my textbook knowledge on several diseases such as Stevens-Johnson and severe bullous pemphigoid.

Being in a large tertiary centre provided a unique opportunity to attend clinical trial clinics as well as specialised psoriasis and eczema clinics at St. John's institute of Dermatology. I was introduced to novel biologic treatments for these debilitating, severe inflammatory conditions. It was encouraging to observe the psychosocial and physical impact of these medications on the patients.

Another aim for this elective was to obtain some experience in dermatologic surgery to gain a better understanding of everything this specialty has to offer. I had the privilege of scrubbing in and assisting in the Mohs surgery lists. It was incredible to observe the complex yet swift process of removing the tumours, reviewing the histology slides (figure 2,3) and finally reconstructing (figure 4) the wounds for optimal cosmetic and functional result. Despite having no prior experience in Dermatopathology, I became more comfortable in recognising the histological features of Basal and Squamous Cell Carcinomas, as I received more teaching and guidance over time. It was extremely rewarding to see worried patients enter the clinic and often leave reassured and cancer-free.



Figure 2 & 3: Frozen tissue sampling machines used to prepare histology slides for microscopic analysis to guide Mohs surgery.

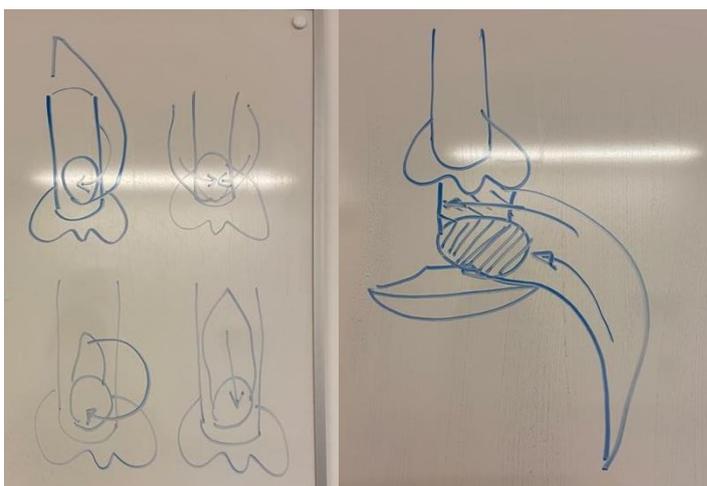


Figure 4: Wound reconstruction- Primary surgical closure versus second-intention healing (SIH) is a consideration after Mohs micrographic surgery.

RESEARCH PROJECT

To keep up-to-date with the latest developments in this specialty, I actively explored some research topics around the use of technology in dermatology. This led to me joining a project that Dr Lynch was working on at the labs in St. John's Institute of Dermatology, King's College. The main aim was to develop efficient models for the quantification and segmentation of structures within skin pathology images. This would hopefully shed light on the variation in skin structure and function between individuals in both health and disease.

Human skin is a complex organ composed of in excess of 20 cell types, arranged in complex three dimensional structures including epidermis, dermis, hair follicles and sweat glands. The morphology of these structures reflects the function of the skin which includes protection against ultraviolet (UV) light, temperature regulation and defence against microorganisms, pathogens and toxins. The histological features of the skin vary according to body site, age, gender, racial origin and the presence of skin disease. The increasing adoption of digital pathology offers the possibility of large scale quantitative analysis of these differences, however this is found to be very labour-intensive. Recent advances in artificial intelligence, particularly in the field of deep learning, have enabled the development of accurate models for medical image analysis. These models were already established at the King's College laboratories. In this research project, we decided to work on developing AI models that are able to accurately segment structures within histopathological images of the skin. These would be applied to the study of both normal skin and skin cancers with the goal of quantifying and understanding the determinants of morphological differences and their influence on skin disease. The first step of collecting data for the AI model was to mark out the epidermis on histology images using a dedicated computer programme. At the current stage of research, we are manually marking out the dermis on the slides to feed the AI model.

CONCLUSION

My elective at St John's Institute of dermatology has been extremely useful in allowing me to experience the different aspects of dermatology; a highly academic area with cutting-edge research that combines genetics, immunology and oncology to enhance clinical practice. This placement has definitely cemented my decision to pursue a career in dermatology. I hope to utilise the skills I have learned during my foundation training and gain further experience in this wonderful specialty.