Ring Device to Induce Hemostasis

The Delayed Diagnosis and Poor Prognosis of Melanoma in People of Color

A Thesis Prospectus
In STS 4500
Presented to
The Faculty of the
School of Engineering and Applied Science
University of Virginia
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Biomedical Engineering

By
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Technical Project Team Members
Roan Back

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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STS 4500
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Prospectus Synthesis: Hemostatic Ring and Delayed Melanoma Diagnosis in People of Color

My technical and STS projects both address aspects of the challenge of creating medical devices in a way that does not provoke healthcare disparities. In what follows, I will outline how the implementation of a hemostatic ring could exacerbate existing disparities in melanoma diagnosis in people of color (POC).

For my technical project, I will outline the development and testing of a hemostatic ring to be used in dermatologic surgeries. Bleeding complications can compromise dermatologic surgeries due to obstructed view, patient/physician anxiety, postoperative bleeding and hematoma formation. Therefore, a device to aid in controlling blood flow, or hemostasis, is needed to apply circumferential pressure to the wound edges and prevent bleeding complications. To address the limitations of current approaches, I will propose a novel design for a hemostatic ring to aid in managing hemorrhage during dermatologic surgery.

For my STS project, I will evaluate why melanoma diagnosis is lesser and later in POC using actor-network theory (ANT) as a framework. Although POC are less likely to get skin cancer because they have relatively larger melanocytes capable of producing more melanin, they are more likely to die from it due to a later diagnosis or presentation (Goss et al., 2014). When it comes to melanoma, the most deadly type of skin cancer, early detection and intervention are associated with improved outcomes (Conic et al., 2018). Thus, an analysis of the factors(actors) that determine melanoma diagnosis in POC is necessary to understand how this discrepancy can be eliminated.

In developing these two projects simultaneously, I was able to put each of the projects into the context of the other. Designing a device to be used in a clinical setting prompted my reflection mainly on what patients will have access to these dermatologic surgeries and what types of medical facilities will have access to the hemostatic ring. Investigating dermatologic surgeries for the removal of skin cancers led me to discrepancies in the melanoma diagnoses in POC. As engineers, we are taught to solve problems. Working on a technically-focused project alongside a more socially-focused project allowed me to not only be a problem-solver, but to also be human with empathy. I value having these two projects connected because it allows me to practice responsible, ethical engineering. As a generation of up and coming engineers, it is crucial that we solve problems *and* empathize with the end users.