

# Characterization of cutaneous microvasculature with three-dimensional imaging: Methods of a novel technique and in a cohort of head and neck surgery patients with attention to smoking status

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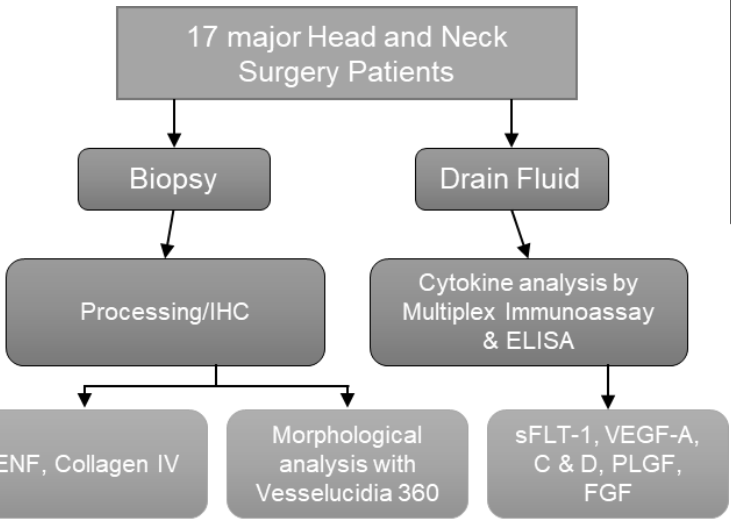
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## Introduction

- Effective wound healing is dependent on regulated angiogenesis and arteriogenesis.<sup>1</sup>
  - Disease states such as chronic alcohol use, smoking, and previous chemotherapy impair vessel maintenance and wound healing.
- Microscopic imaging methods to study cutaneous vascular microstructure have their limitations.
- Better insight into the dynamics of cutaneous vascular network is critical for successful wound healing

## Methods



## Results

Figure 1: Confocal microscopy images of smokers (A), former smokers (B) and non-smokers (C).

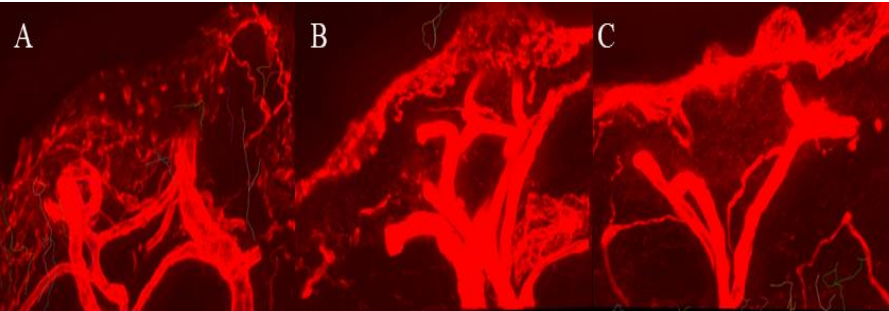
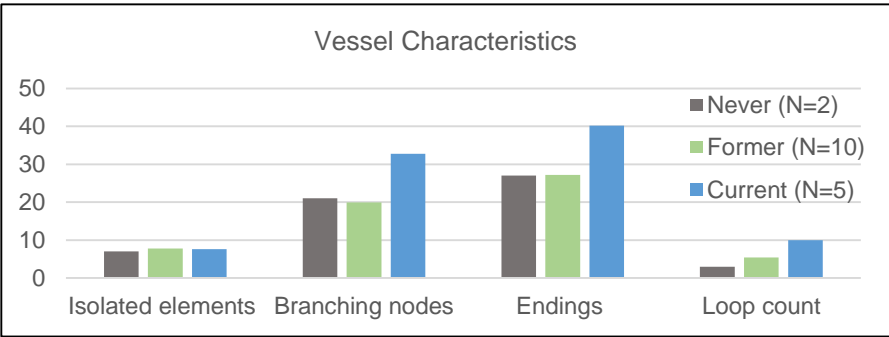


Figure 2: Vessel characteristics by smoking status



- Never smokers had larger caliber, smooth walled, and more organized microvasculature (Fig. 1C).
  - Current smokers had more tortuous vessels with increased branching nodes, endings, loops and irregular vessel walls (Fig. 1A, Fig.2).
  - Former smokers had more irregular vascular lumens and disorganized architecture (Fig. 1B).
- Males, current alcohol users, and prior chemotherapy patients had higher isolated elements compared to females, non-alcohol users, and those without a history of chemotherapy.
- Isolated elements were significantly higher in patients that returned to the hospital due to a wound complication and needed long term wound care.
- VEGF-A and PLGF are significantly correlated with vessel metrics

## Discussion and Conclusion

- Cutaneous microvascular architecture is indicative of vascular health, and such vessels play a critical role in acute wound healing.<sup>2</sup>
- Excessive vascularity and aberrant remodeling is consistent with reduced perfusion and oxidative stress.<sup>3</sup>
- We found consistencies with the use of Vesselucidia 360 for characterizing the distribution of cutaneous microvasculature in our study cohort.
- This can guide clinicians to use patient-specific strategy in the management of patients for a successful post-surgical wound healing outcome.

## References

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