Reducing Risk of Extravasation and Improving Vasodilation through a Modular IV Access Device

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Introduction

Background

- Peripheral IVs are utilized in multiple clinical settings:
  - Radiology, Emergency Medical Services, Emergency Departments
- Peripheral IVs uses:
  - Radiology, Fluid replacement, Drug/ Imaging Administration, Blood sampling

Problem

- 20% of patients at risk of a poor IV experience[1]
  - Pediatric, elderly, obese, diabetic, drug using, and cancer patients
- Improving IV insertion saves money and time, improves the patient's experience.

Needs Statement

An easily employable device developed to minimize extravasation and assist technicians in locating veins during IV insertion in patients.

Proposed Solution/ Design

Features:

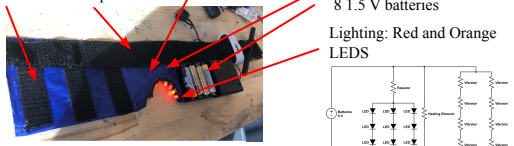


Figure 1: Final Prototype

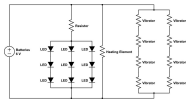
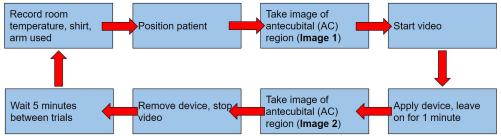


Figure 2: Final Prototype Wiring Scheme

Testing

Workflow:



Analysis:

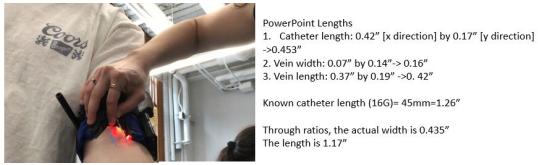


Figure 3: Image Processing

Results:

Method	Method to Baseline Ratio
IV tourniquet	1.26 ± 0.19
Device	1.58 ± 0.18

T-test results: **0.022** (statistically significant)

Figure 4: Additional Data from Processing

Red forearm and significant forearm vein

Reimbursement/ Patents

The Device would be covered via Medicare/Medicaid using the following codes:

- **I87.2 of ICD-10-CM:** 'venous insufficiency (chronic) (peripheral)'[2]
- **ICD-10-PCS code BW25YZZ:** Computerized Tomography (CT Scan) of Chest, Abdomen and Pelvis using Other Contrast[3]
- **CPT 36406 and 36410:** Venipuncture, younger than age 3 years, necessitating physician's skill, not to be used for routine venipuncture[4]

Patentability: No patents for IV tourniquets currently exist that incorporate all aspects of our device.

Conclusion

- We have created a device that integrates imaging, a tourniquet, vibrations, and heating together
- In comparison to usual methods, our solution leads to more vasodilation than a standard tourniquet
- Future work includes making the product more comfortable and easier to employ; distributing surveys

Acknowledgements

We would like to thank Dr. Conrad Zapanta and Argaja Deepak Shende for their constant support and guidance through the project. We are grateful to the Undergraduate Research Office for their financial support for this project. We would also like to thank the team at Bayer, Linda van Roosmalen, Ned Uber, and Dave Griffiths for their assistance and guidance throughout the duration of the project.. There were many nurses, technicians, and physicians that provided priceless feedback. Lastly, we express our gratitude to the CMU TechSpark for their manufacturing capabilities that we frequently used.

References

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