RED LIGHT VEIN DEVICE

By: Andrea Haddadin, Glenn Sutter, McLean Schmit, Luana Fenstemacher, Danielle Spence

VEIN DETECTION TECHNOLOGY

- Veins sit about 5-10 mm below the surface of the skin.
- Red light technology uses reflection and absorption of high energy wavelengths (700 nm) to illuminate veins at that depth
- Nylon tourniquets use low force for a higher strain than other materials to create pressure surrounding the arm.

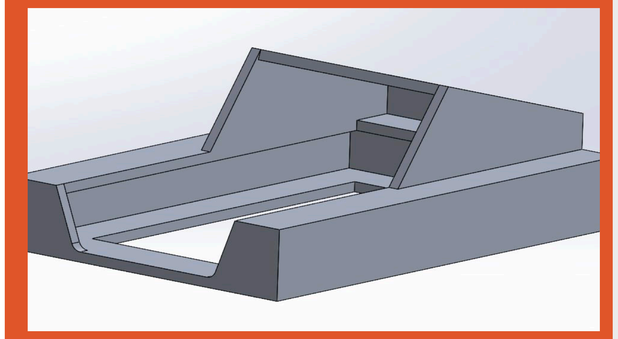


Figure 1. Final SolidWorks model of the casing .

Opportunity

- 99% of patients have adverse reactions to blood work
- Difficulty of detecting veins due to high vein variability leads to bruising, multiple insertions, pain, and discomfort
- Current LED light devices cost thousands of dollars and are not affordable for clinics or hospitals
- Current technology does not allow for blood draw to occur while the device is in use, if used by one person

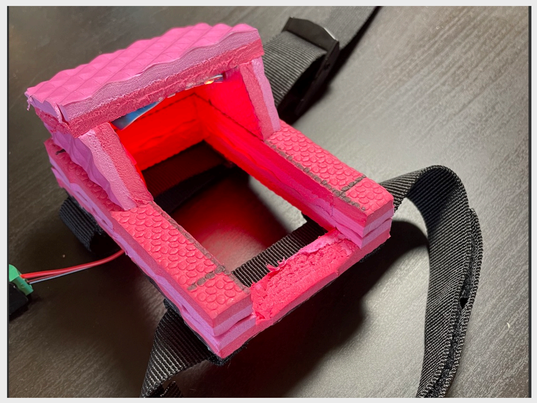
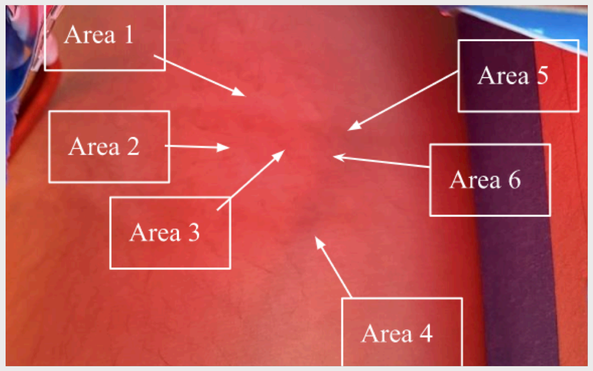


Figure 2. Final model including draft casing, tourniquet and support straps and LED lights.

FINAL PROTOTYPE

- Adjustable, size inclusive nylon tourniquet and support strap.
- Red LED light strip connected to external power source.
- LED light strip on ‘roof’ of casing to minimize shadows
- “Hands Free” usage of device due to straps attachment to patient



	Vein area (4-6)	Non-Vein area (1-3)
Average R value	81.3	147.6
Average B value	136.6	57.7

Figure 3. Final trial detecting red and blue pixel values.

FUTURE WORK

- Develop a flexible rubber model casing to adhere to arm curvature of patients
- Adjustments to power source by adding in an internal battery for easy transportation of device

DISCUSSION

- Final design allowed us to maximize differentiation between the skin and the vein while minimizing shadows.
- We had decreased the final saturation of the lights to allow for reflection and absorption to occur without the obstruction of over-saturation.
- Device cost of $200 makes it more accessible with a manufacturing cost of $78.00.

ACKNOWLEDGEMENTS

- Dr. Adam Higgins from the school of Chemical, Biological and Environmental Engineering at OSU.
- Dr. Joe Baio from the school of Chemical, Biological and Environmental Engineering at OSU.
- Rachel Thompson and Jade White for the continued guidance and support.

Oregon State University