

Vein Visualization Technologies for Peripheral Vascular Access Device Placement

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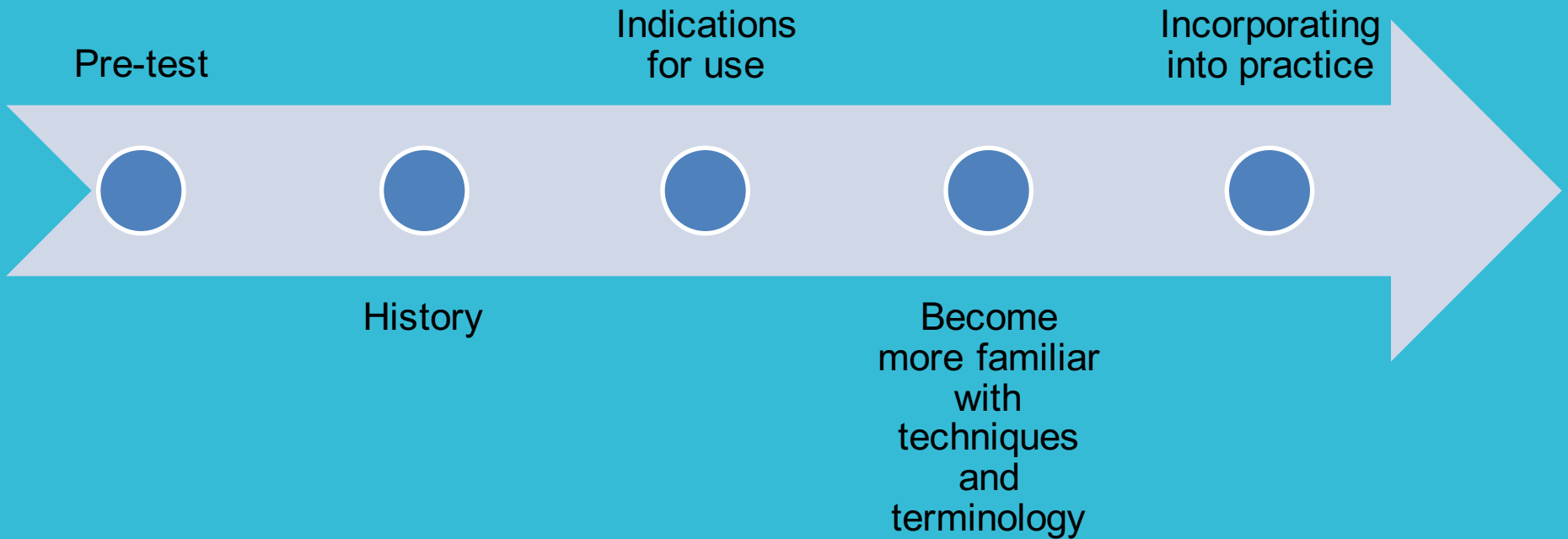
Disclosure

- None

Learning Objectives

- Utilize ultrasound/infrared technology to enhance vascular visibility and cannulation
- Examine safety principles for these technologies
- Learn anatomy and whether vein depth influences success rate
- Learn how infrared technology functions
- Identify positive outcomes related to the use of vein visualization technologies

Outline



Pre-test

Are there **published** risk factors for difficult IV access?

Which is true of color ultrasound?

Arteries are blue and veins are red

Arteries are red and veins are blue

Does depth of vein matter for success rate?

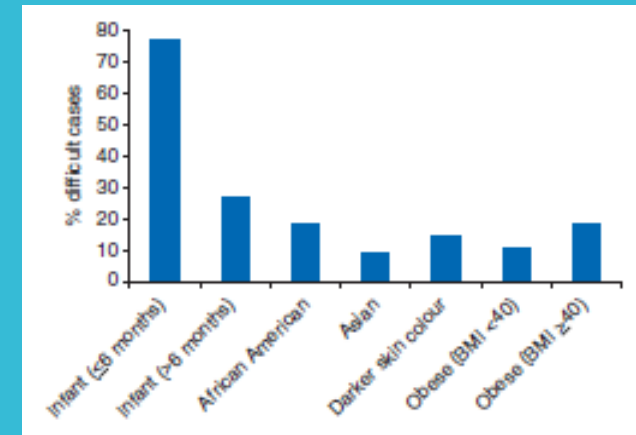
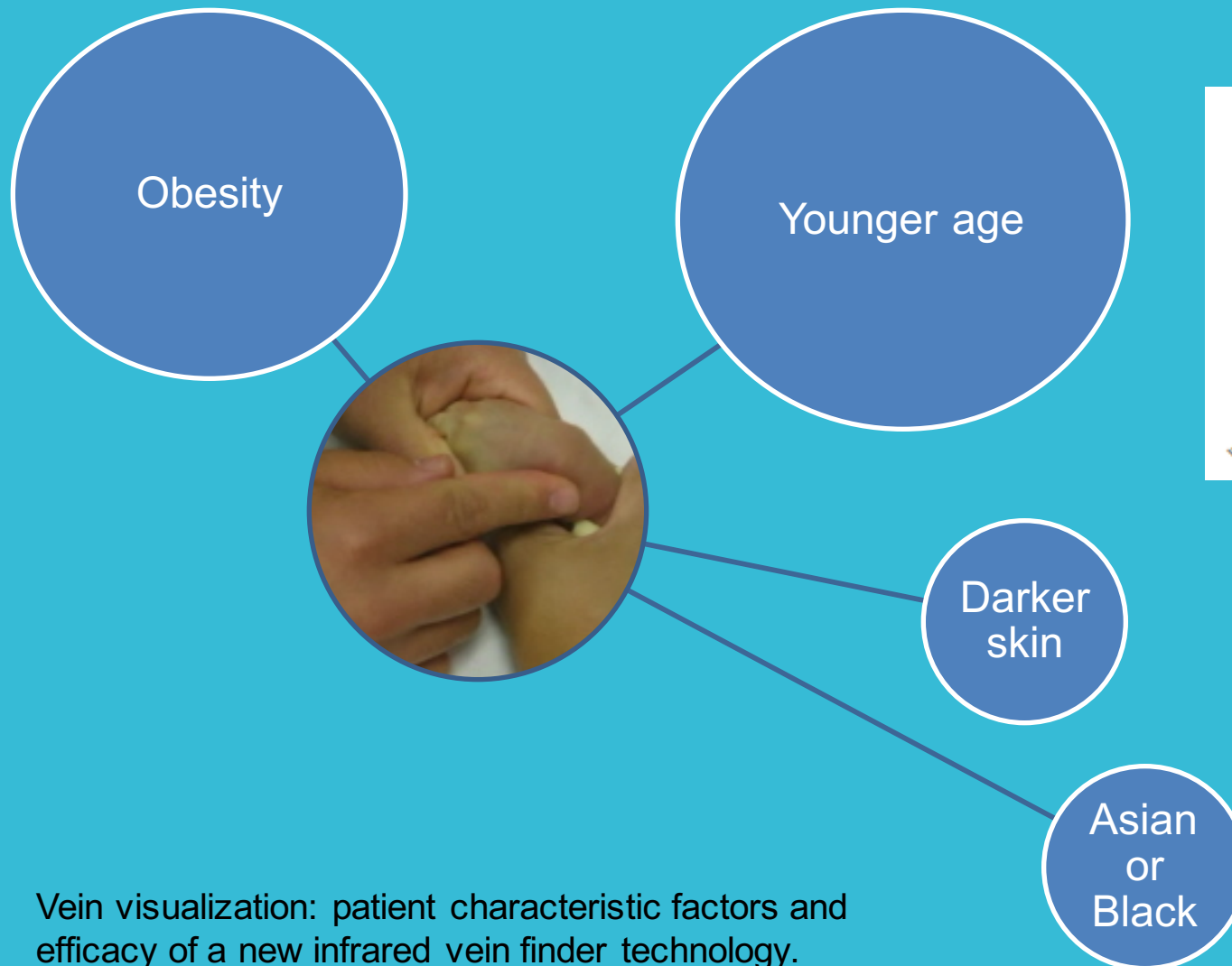
Infrared technologies image deeper veins more clearly than ultrasound

T/F

Infrared technologies image arteries better than ultrasound?

T/F

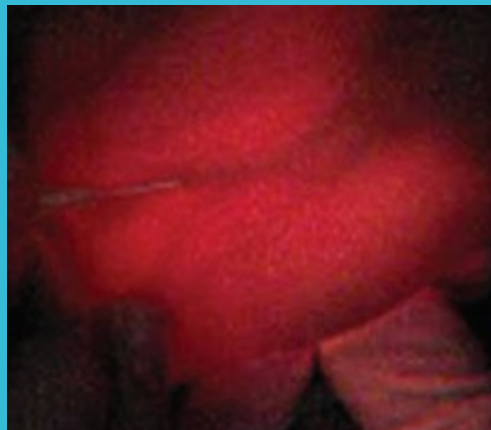
Are there published risk factors for difficult IV access?



Vein visualization: patient characteristic factors and efficacy of a new infrared vein finder technology. British journal of anaesthesia. 110:966-971. 2013

What technologies are available to enhance vein visibility?

- In the past, esmarch bandages, vacuum devices, doppler and application of nitroglycerin ointment (Whiteley 95, Roberge 87)
- Ultrasound
- Infrared
- Several others



Vascular Technology

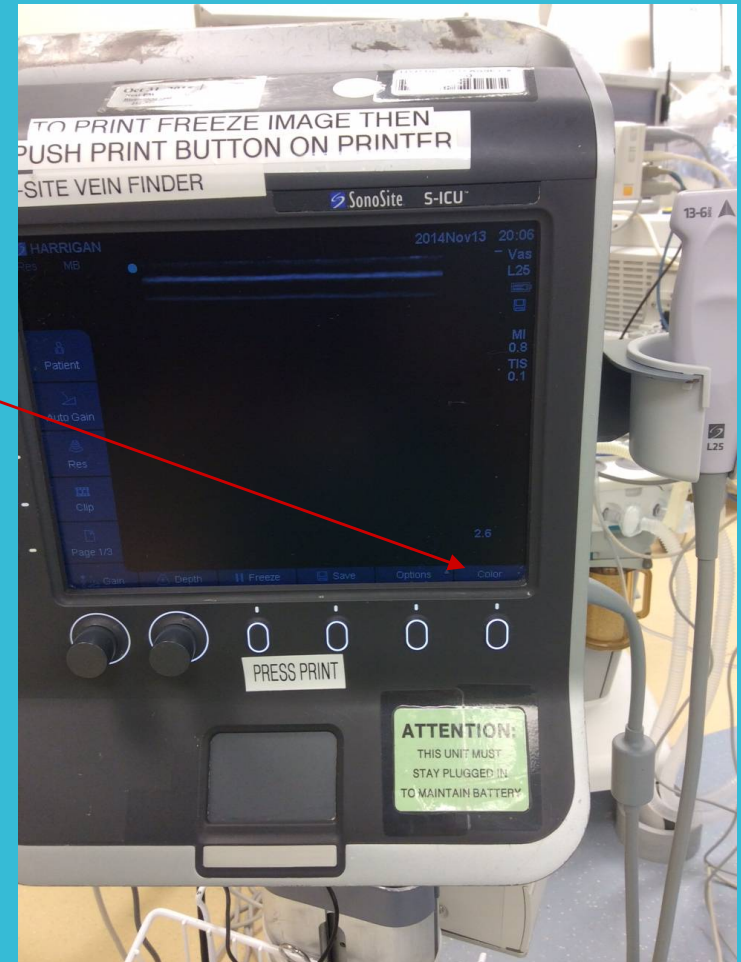
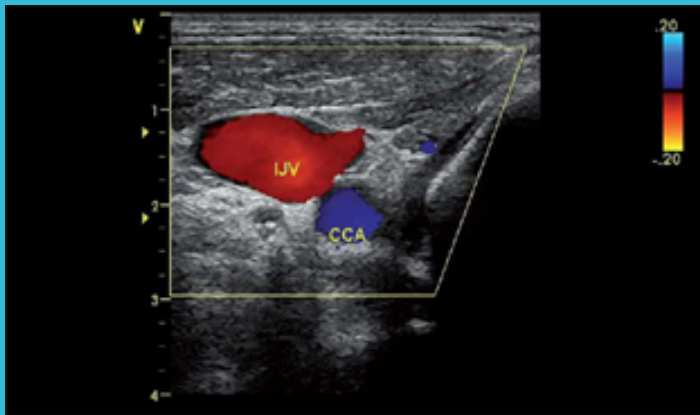
- Benefits- Decrease complications, increase success rate, decrease attempts,
- Economically, considerable labor and work hours are spent by nursing, physicians, and staff on accessing these veins, including general anesthesia
- Risks- few, costs of purchasing machines

Ultrasound

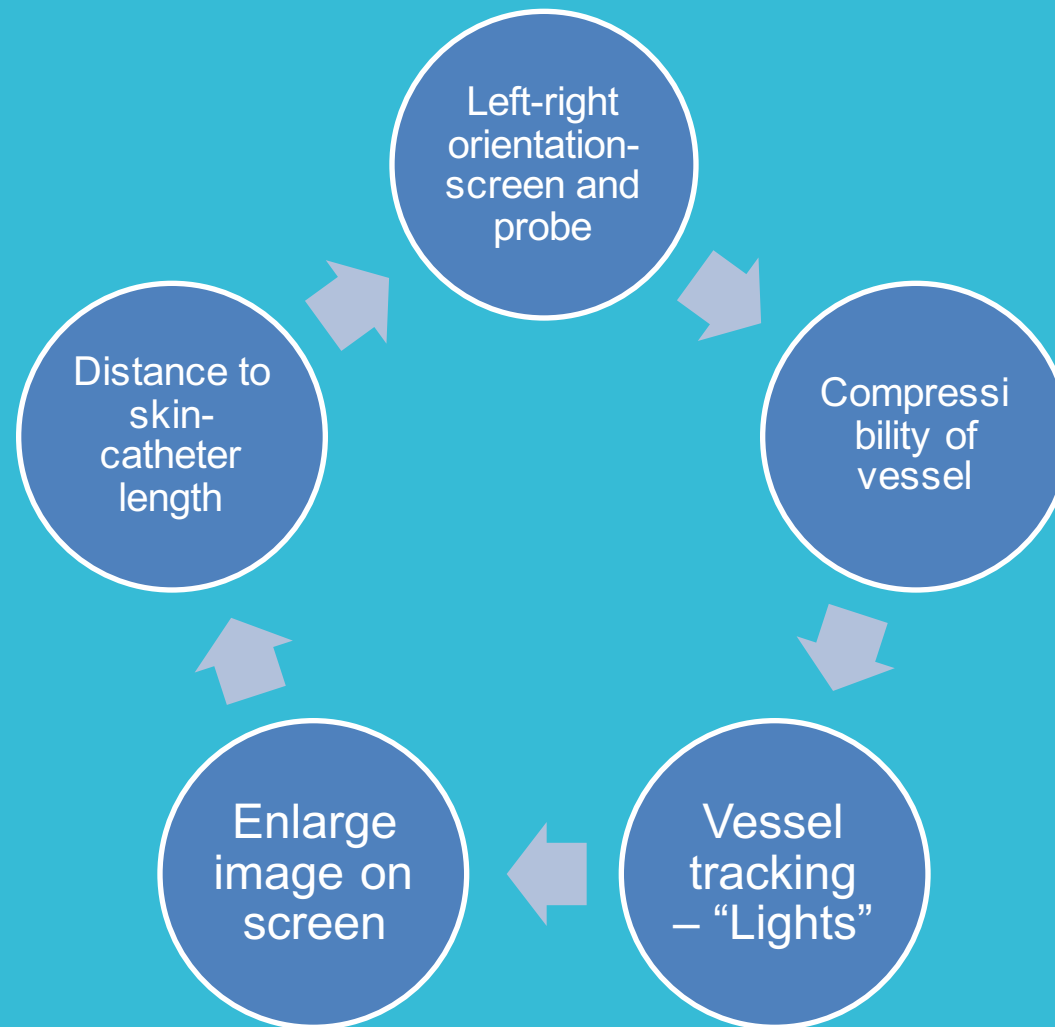
- Late 19th century- brain tumor scans in cerebral ventricles
- Cardiac, OBGyn, Endocrine
- Curie family - Piezoelectric Quartz Electrometer

Color

- Color



Ultrasound 5 Step Pathway for Vascular Access



Ultrasound Pathway for Vascular Access

Tenting

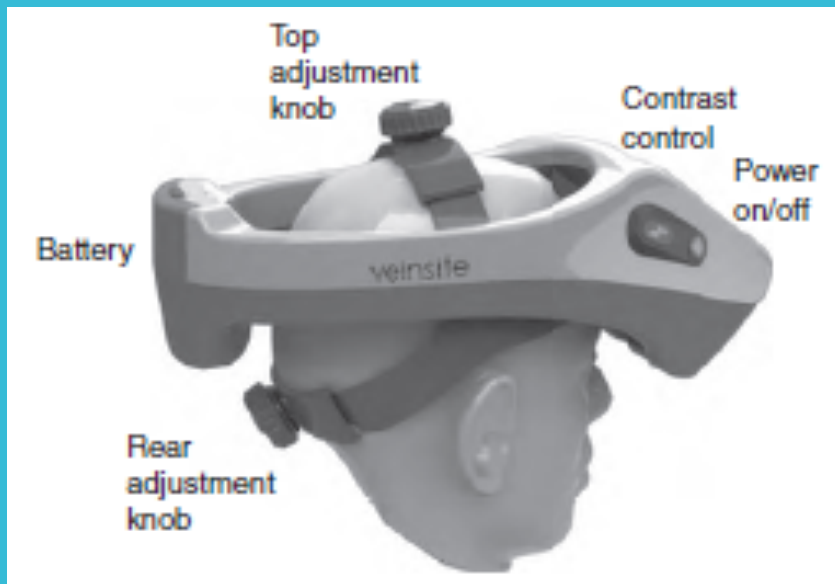
Puncture

Circling

Infrared Background

- Agriculture, materials science
- How does infrared technology function?
- What type of veins can one see?
- What steps does one need to take to operate infrared vein finding devices?

Infrared Devices



Infrared Utility

- Depth
- Eyesight
- Blind- anatomy

Ultrasound vs. Infrared

- Superficial versus 3D
- Different learning curves
- Economic costs vs. priceless patient care

Future Research

- Impact on vessels-Vasodilating gas/drugs, fluid status
- Mobile devices
- Best attempts- bruising, bacterial infection, extravasation, phlebitis, thrombosis, embolism, or nerve damage

Conclusion

- What is a helpful approach to develop my skills at using these devices?
- What online resources are there?
 - Oxford University Podcast- “Tricky Vein Society”
 - Vein visualisation with near-infrared technology
 - http://www.oxfordjournals.org/our_journals/bjaint/podcast_episodes.html