

Disclosures

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Purpose/Background

The goal of this investigation was to establish a process of training that would improve consistent performance and outcomes. Over the past two decades, the application of ultrasound for venous enhanced the safety and efficacy of the most frequently performed invasive procedure in healthcare, the peripheral intravenous catheter insertion (PIVC). While ultrasound application reflects positive outcomes, complications continue to occur, many related to inconsistency in training and competency assessment.

The identified gap in the procedural literature is a detailed and systematic protocol that addresses needle identification to vessel cannulation using ultrasound guidance. This critical phase of the insertion process not only determines successful vessel cannulation but also helps to avoid many complications such as failed attempts, arterial or nerve puncture, and post-insertional infiltration/extravasation. Mastery learning with minimal performance skills guides a process of training to produce greater consistency in insertions. The 3-Stations of the Needle were developed as part of the training process to achieve these objectives.

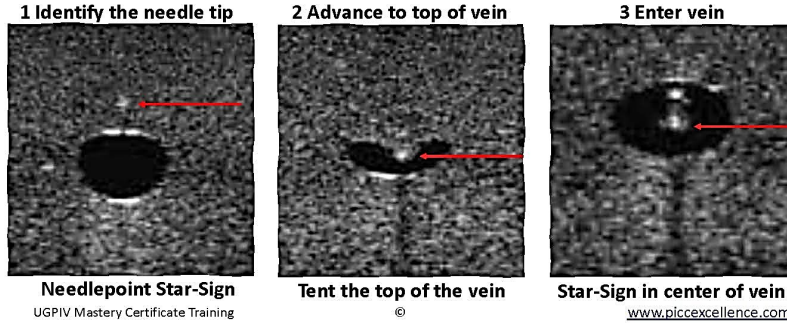
Results

The 3-Stations of the Needle provides a replicable ultrasound training method applied to every insertion for peripheral and central catheter placement producing greater consistency for first insertion success.

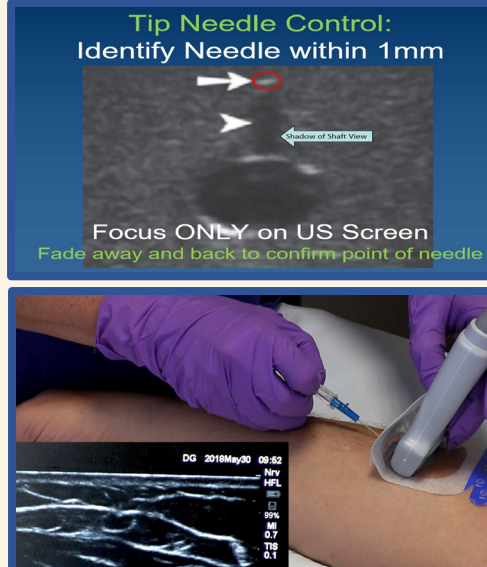
The Importance of Needling Skills and 3-Stations of the Needle for UGPIV Training and Success

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Three Stations of the Needle



Module 2: Ultrasound Needle Guidance Skills Simulation Tool			
Name _____		Facility/Unit _____	
Participant has demonstrated competence in performing the following skills:			
NEEDLING SKILLS	DELIBERATE PRACTICE SKILLS SIMULATION		Global Skill Progress Chart
Needle ID	1. Using transverse view, do a centered, shallow insertion. Identify needle tip position immediately in phantom within first four mm of insertion. See Star Sign. First IT. Follow IT. Look for double-dash/train track sign of bevel.		
Screen FOCUS	2. Practice focusing eyes on screen only – not looking at hands. Consider using center guide marks on screen to keep insertions centered. Establish a plan of needle insertion angle and a roadmap to success.		
Probe	3. Position probe perpendicular to needle to gain best view		
Probe FADE	4. Perform probe micro-movements just needle tip, always verifying tip-end of needle. Ring-down shadow is needle shaft, not needle tip. Keep probe in contact with skin.		
Probe/Needle ADVANCE	5. Practice probe and needle walking, advance probe, advance needle, small, incremental movements that locate needle tip after each advancement. Identify star-fade as probe moves away from needle tip. Only proceed once ring is a ring.		
Needle STATIONS	6. Coordinate needle tip by (1) identifying needle tip position immediately upon insertion, (2) control of needle down to top of vein, and (3) insert into vein and view double-dash train track sign within one operating level point of needle. Double-dash looks like a donut and is visible once catheter is inserted. See donut view - Donut is a GO! Do up-down needle movement to confirm vein entry.		
Star Sign ID	7. Show the sign in middle of vein, brighter, brighter, brighter, then fade-out by moving probe, then advance needle to see star again.		
Needle WALK-IN	8. Drop the catheter angle slightly after reaching middle of vein. Hold star sign in upper third of vein. Advance needle and catheter into vein by using walking steps of probe first, needle second, advancement moves while keeping star sign in center of vein. Use probe advance, needle advance in micro-movements to follow the needle point.		
Knowledge	9. Describe all key signs for successful needle guidance. Sign closed – work it in your mind.		
Final check for SUCCESS with Test prep	10. Perform full needle insertion on phantom using all key signs. <ul style="list-style-type: none"> First insert, then see needle ID Star Sign and double-dash of bevel tip Advance NEEDLE – (RING) NEEDLE - If you see needle shadow and ring-down, know this is the needle shaft. Advance probe to fade out, then advance needle to keep view of point of needle <ul style="list-style-type: none"> Control needle and stabilize to position on top center of vein Enter vein, see star sign and position inside middle of vein. Fade-out and back Reduce catheter angle slightly. Follow star-sign walking in deeper probe/needle Thread of catheter, verify on longitudinal view, flush to confirm popping champagne bubbles in vein Practice finding 3 key needle signs over and over to increase speed with identification 		
Comments:			
Preceptor name _____	Date _____		
Preceptor signature _____	Email _____	Title _____	
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Process/Limitations

This newly launched 3-Stations of the Needle skills process is standardized training within a Mastery Learning Certificate program. While limited outcome data is published, the clinician feedback from beginners and advanced inserters validates improved performance with the application of the skills. The blended online courses and 5 skills modules take the learner through a series of steps to validate performance, requiring a commitment of approximately 12 hours to complete the training. Additional time is required for supervised insertions and the Mastery Rating Scale, which signifies achievement competency. An ongoing data collection process further validates performance and can be used quarterly or annually to check the success and dwell time levels of the UGPIV insertions.

Mastery Documentation		Data Collection Audit Tool: Ultrasound-Guided PIV Independent Patient Insertions													
Name _____		Dates of Data Collection _____													
Title _____		Facility/Location _____ Department _____													
Summary: Total number of patient insertions _____		Total attempts _____			Total successful _____			Success achieved 52 attempts _____			% of Success _____				
Patient Room and Date	Site	Insertion Type	Insertion Depth (cm)	Catheter Brand/ Gauge/ Length	Number of Attempts	Successful Y/N	Failed in first 4mm Y/N	Failed in 4-8mm Y/N	Failed in 8-12mm Y/N	Failed in 12-16mm Y/N	Failed in 16-20mm Y/N	Failed in 20-24mm Y/N	Failed in 24-28mm Y/N	Failed in 28-32mm Y/N	D/C Date and Reason/Complication
1															
2															

Conclusion

This systematic process of UGPIV training that applies the 3-Stations of the Needle and level of performance provides a training process that is standardized to apply to any clinician and healthcare facility. Following a thorough review of the Mastery Training and adherence to INS Standard, this training program received the first INS Seal of Approval for UGPIV education.



References

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