

Improving Confidence and Competence in Ultrasound-Guided IV Cannulation in the Emergency Department: A Quality Improvement Project

Dr Nathan Walzl (Emergency Development Fellow) and Dr Elizabeth Nimmo (Consultant in Emergency Medicine)
Emergency Department, Forth Valley Royal Hospital, Larbert FK5 4WR

Introduction:

- Cannulation of patients with difficult venous access is a common challenge in ED
- This can lead to delays in treatment, multiple cannulation attempts, and patient discomfort
- Ultrasound-guided IV cannulation (US-IV) has been shown to improve success rates ⁽¹⁾
- Staff confidence with this technique remains variable

Aims:

- To evaluate current confidence levels with US-IV
- To deliver an educational package, including in-house creation of ultrasound phantoms
- To assess impact on procedural confidence

Methods:

- Distributed a survey to clinical staff aiming to determine prior training, frequency of US-IV use, perceived barriers, and self-reported confidence
- Designed an educational package comprising of didactic and simulation-based teaching
- Designed and built custom ultrasound phantoms using low-cost materials
- Delivered a teaching intervention consisting of structured demonstration and supervised cannulation practice on phantoms
- Participants were re-surveyed, providing feedback on teaching quality, usefulness of the educational package, perceived skill improvement, and ongoing perceived challenges
- Outcome measures included change in confidence scores and self-reported procedural competence

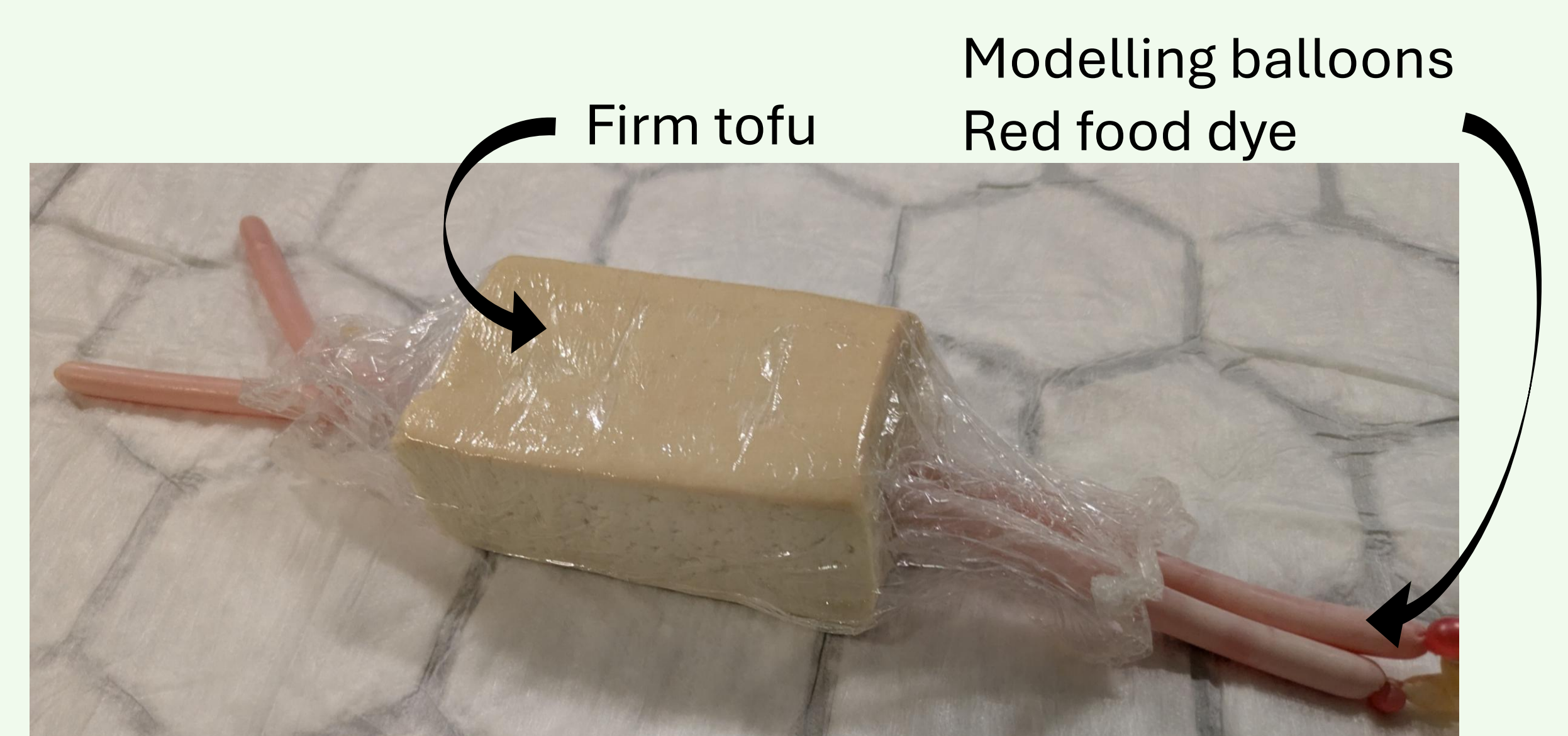
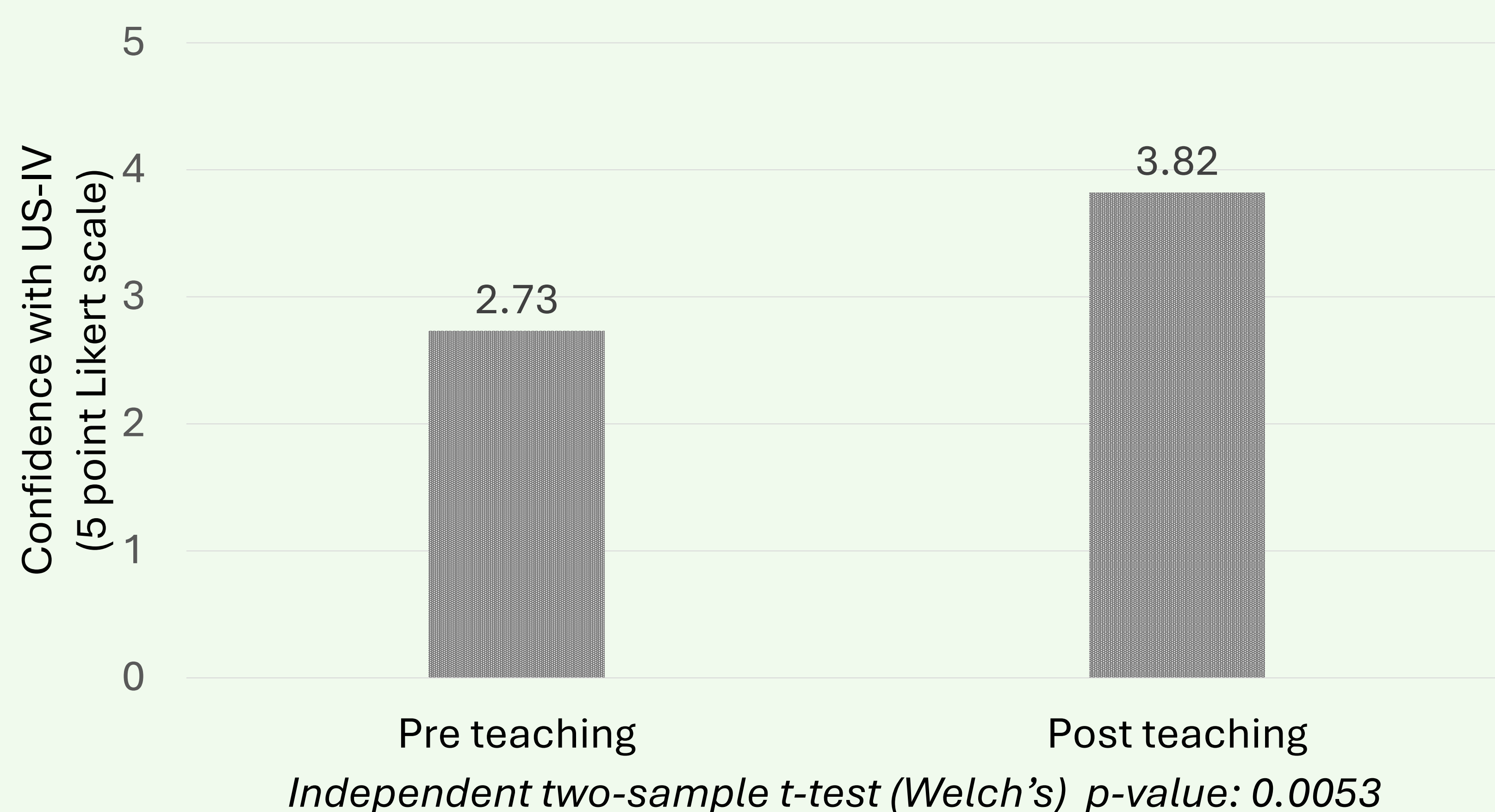
Results:

- Baseline data (n=15) demonstrated low routine use of US-IV and limited formal training.
- Post-teaching confidence scores increased significantly across all staff groups, with participants reporting improved understanding of probe handling, vein identification, and needle visualisation.
- Qualitative feedback highlighted the value of hands-on simulation and a structured step-by-step approach.

Conclusion:

- This focused, cost-effective, simulation-based teaching session produced meaningful improvements in staff confidence and perceived competence in ultrasound-guided IV cannulation.
- Embedding regular teaching and supervised practice could further enhance skill retention and expand safe adoption of US-IV in the department.
- Further PDSA cycles could assess translation into clinical practice and impact on cannulation success rates.

Self-reported confidence levels with US-IV (n=15)



Example of in-house created US phantom (£ 1.35)

References:

1. Olmedo AA, Canamar CP. Increasing First-Attempt Success in Difficult Venous Access Patients Using Early Identification and Ultrasound-Guided Peripheral Intravenous Cannulation. *J Emerg Nurs.* 2026 Feb 26;S0099-1767(26)00021-8. doi: 10.1016/j.jen.2026.01.012. Epub ahead of print. PMID: 41746230.