Background: The optimal method for teaching Ultrasound Guided Peripheral IV Insertion (USGPIV) is unknown. Poor needle tip visualization has been cited as a reason for USGPIV failure. Twinkle artifact (TA), seen on ultrasound in the Color Doppler mode, is used to highlight hyperechoic structures in other clinical settings. The objective of our study was to investigate whether teaching students USGPIV utilizing TA, as a way to enhance needle tip visualization, would improve first pass success and secondarily decrease time to vessel cannulation.

Methods: This was a prospective, randomized study of premedical and first year medical students with no prior USGPIV placement experience. All students received a 15-minute didactic on ultrasound (U/S) physics and USGPIV. Students were randomized to learning and performing USGPIV with TA and without (control). The two groups were separated and given directed bedside instruction by EM educators trained in ultrasound guided techniques. They were guided through two successful cannulations on a venous access phantom model. After 2 successful cannulations, individual students were given 5 minutes to perform USGPIV with and without TA on phantom models under the direct observation of an EM educator. Our primary outcome was rate of first pass success. Secondary outcome was total time to cannulation.

Results: Forty students were enrolled, 19 (47.5%) were premedical and 21 (52.5%) were first year medical students. None had any prior USGPIV experience. 17 (42.5%) were randomized to the TA group. Rates of first pass success were similar in both the TA (82%) and control groups (57%), p = 0.095. There was a difference in the mean time to cannulation seen between the TA, 50.76 seconds (SD 65.47) versus control groups, 85.30 seconds (SD 26.93), p = 0.048.

Conclusion: In this first study of students utilizing TA to identify needle tip, students trained using this technique were able to achieve successful USGPIV cannulation in a shorter amount of time. However, there was no significant difference in first pass success. Future studies should utilize a larger sample size of learners to address the trends reported in this study to uncover the usefulness of TA identification.