

SCHOOL OF MEDICINE

CASE WESTERN RESERVE

### INTRODUCTION

As the importance of preclinical physician assistant (PA) student ultrasound (US) education is gaining attention, innovative and costeffective ways of facilitating learning must be considered.

## **OBJECTIVES**

Each puzzle is designed to teach distinct US scanning techniques using puzzles specifically designed to test individual skills.

US Technique	Skill Test
Rotation	All Puzzles
Depth	Ball on Steps
Alignment	All Puzzles
Tilt	Tilted Domino
Identification	Grapes & Olives

	T1	T2 (Immediate	T3	T4
	(Pre-Test)	Post-Test)	(3m Post-test)	(7m
Domino Top	16.67%	27.78%	29.41%	55.5
Domino Bottom	16.67%	27.78%	29.41%	55.5
# of Olives	0	3	1	2
# of Grapes	0	2	1	2.5
# of Pimentos	1	2	0	3
# of steps	39%	56%	47%	90%
Ball on right step	22%	22%	29%	80%



#### REFERENCES

1. Ultrasound in medical education: listening to the echoes of the past to shape a vision for the future. N. Lane, S. Labham, L. Joseph, D. Bahner, J. Fox. European Journal of Trauma and Emergency Surgery. 2015. 2.The state of ultrasound education in US medical schools: results of a national survey. D. Bahner, E. Goldman, D. Way, N. Royall, Y. Liu. Academic Medicine: Journal of the Association of American Medical Colleges. December 2014. 3.Basic ultrasound curriculum for medical students: validation of content and phantom. M. Yoo, L. Villegas, D. Jones. Journal of Laparoscopic & Advanced Surgical Techniques. December, 2004. 4. Shooting with sound: optimizing an affordable ballistic gelatin recipe in a graded ultrasound phantom education program. J. Cline et al. Journal of Ultrasound in Medicine. June, 2015. 5. Integration of a low-cost introductory ultrasound curriculum into existing procedural skills education for preclinical medical students. Maloney et al. Journal of Ultrasound in Medicine. February, 2017.

# Puzzle-Based Ultrasound Education for Physician Assistant Students Mariah Bower PA-S, Ryan Nazemian MD, Mada Helou MD



### **METHODS**





Evaluation			
Superficial	Complete the dots on the domino.		
	Fill out the grid with P, O, or G to denote what you see in the phantom.		
23	Draw the steps and indicate which step the ball is on.		

### CONCLUSIONS

• This curriculum proved to be low-cost, effective, and efficient. Total time spent completing all three sessions was 40min and total cost was \$2.70 per student.

Overall, students showed statistical improvement with ultrasound technique, with most improvement occurring from the first to last session.

The small sample size limited the results of this study. In the future, a larger sample size will be used to better evaluate significance of findings.

• In addition a post study exam will be used to evaluate application and integration of US techniques.