Training Ultrasound Image Plane Perception for Technical Medicine Master Students

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Introduction

Ultrasound as a medical imaging tool is becoming increasingly popular. One of the major difficulties for the unexperienced sonographers during their training is the understanding of plane perception during scanning. As an experimental simulation center with a strong relation to medical imaging, we want to improve this learning process in our students.

Objective: Increase ultrasound image plane perception by structured simulated training.

Method

We included 28 students, obtaining a total of 252 images *(Simbionix Ultrasound simulator (U/S Mentor™) - Module Sonography Basic skills – Task 1, "Basic hand-eye coordination").* Students are asked to align the probe (Figure 1) in such a manner that the virtually placed 3D volume object is visualized according to the predefined plane (green line Figure 2). The study included the alignment of three cross sections per object. We determined the obtained total score, total time needed to obtain the proper cross sections of all nine objects, time needed per step and the number of hints used. Statisic analysis was done using paired sample T-testing.

Results

All participants obtained 9 images, with an average score of 65.5% (SD 8.3), the total time needed was 389 seconds (SD 155sec) and time per step on average was 43 sec (SD 17sec). The number of hints used varied highly (0-22 hints), with a median of 3. The second part of the analysis (Table 1) showed that obtaining the second and third object direction had significantly reduced times per step (respectively p=0.01 and p=0.005).

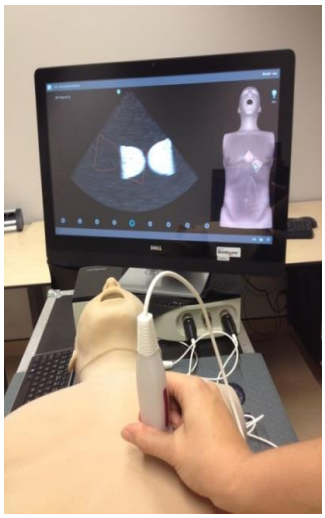

Figure 1 Placement of probe on mannequin to obtain cross section

Figure 2 Alignment of object (white) to predefined plane (green line)

Table 1 Average time (sec) needed to obtain the first, second or third cross section per object

	Mean	SD
All first cross-sections object	79,7	82,3
All second cross-sections object	38,5	34,6
All third cross-sections object	36,1	36,6

Conclusion

Our study shows that obtaining the first cross-section, doing the main plane perception analysis, takes most time. Additional research is required to determine the total effect as well as to study the translation of plane perception in a simulator to real medical image scanning.