North American Proceedings in Gynecology & Obstetrics

Special Issue
ACOOG Conference Abstracts
Spring 2023

Effects of Osteopathic Training and Medical Simulation on Lumbar Puncture Landmark Identification in American Medical Students

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Abstract

BACKGROUND:

- Medical schools traditionally spend the first two years on lecture based didactics.

- SIMS (Student Initiative in Medical Simulation) is a nationally recognized organization. NYITCOM's chapter began research on the impact of simulation in conjunction to osteopathic manipulative training on students' ability to accurately identify clinically important landmarks.

- It is estimated that 60% of US births use neuraxial labor analgesia. The CDC reports that 31.8% of births in the US in 2020 were delivered via cesarean section 2. These require providers well-versed in spinal anatomy.

- The first objective is to evaluate the impact of OMM curriculum on the confidence and accuracy in identifying landmarks for LPP.

- The second objective is to evaluate the impact of skills workshops on the confidence and accuracy in identifying landmarks for LPP.

METHODS:

- This was conducted as a longitudinal study over three time points.
    - Phase 1 (n=32): After spinal anatomy
    - Phase 2 (n=43): After lumbar OMM
    - Phase 3 (n=39): After LP simulation workshop
        - Attended LP: n=13
        - Did not attend LP: n=26
- At each time point the participants were asked to:
    - fill out a questionnaire.

- place a marker at the level between L4 and L5.

- Data collected during these rounds included:

  - Accuracy by distance from baseline LP point (centimeters)

  - Time taken to complete the task (seconds)

  - Confidence (Likert Scale)

RESULTS: Before data collection, the true lumbar puncture point was measured on the live model by an OMM faculty member. The standard deviation away from that point was then recorded. During phase 1 (before exposure to lumbar spine OMM, while in an anatomy course), the average standard deviation from the true LP point was 3.19 cm. During phase 2 (after exposure to lumbar spine OMM), the average standard deviation from the true LP point was 2.66 cm. Finally, during phase 3 (after a simulation workshop with a lumbar puncture model), the average standard deviation from the true LP point was 1.73 cm on a male model, and 1.31 cm on a female model.

The average time to find and pin the landmark between L4 and L5 spinous processes during phase 1 was 27.85 seconds. During phase 2 of the study, the average time for first year medical students to find the lumbar puncture point was 19.88 seconds. During phase 3, after participating in the lumbar puncture worksop, the average time to pin the landmark between L4 and L5 spinous processes was 16.4 seconds on a male model, and 14.21 seconds on a female model.

The students were surveyed to assess their confidence in performing a lumbar puncture spinal tap. Confidence was assessed using a 1-5 likert scale. During phase 1 of the study, the average confidence was 2.5. After exposure to lumbar OMM during phase 2, the average confidence was 3.32. Finally during phase 3, after the lumbar puncture simulation workshop, the average confidence was 3.38 and 3.36 for the male and female model respectively."

DISCUSSION/CONCLUSION:

- This study showed that incorporation of a simulation workshop after exposure to OMM improves the confidence level of students accurately identifying the LP landmark, reduces the time it takes to locate the point, and decreases the standard deviation from the actual LP point on the model.

- Simulation can serve as a "refresher" as indicated by the difference between LP and No LP groups

- Further study needs to be done to track retention of clinical skills further throughout the students academic career.

- Other studies can be done comparing student's performance on male and female models and how that correlates with the gender of their OMM lab partners.