## **Student Perception of an OMM Virtual Practical Examination: In the Setting of Social Distancing**

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#### **ORIGINAL RESEARCH**

## Abstract

**Introduction**: Osteopathic manipulative medicine (OMM) practical examinations (PEs) are important for assessing osteopathic medical students' cognitive knowledge and psychomotor skills required for osteopathic manipulative treatment (OMT). In the response to the COVID-19 pandemic, first-year medical students at Des Moines University (DMU) were no longer allowed to participate in a standard in-person PE (sPE) in December 2020. A novel virtual PE (vPE) over Zoom was developed to assess the students' understanding of OMM learned in lab to replace the sPE.

**Objective**: To determine if the vPE was perceived by the students as a successful and efficacious alternative to the sPE.

**Method**: After the graduating class of 2024 completed their vPE, an administrative email from the DMU OMM department was sent to gather anonymous, voluntary student feedback evaluating their perception and experience of the vPE. The survey consisted of 5 Likert scale questions that asked students to determine the extent they agree to 5 distinct statements and the survey contained a freetext response question asking for suggestions to improve the vPE experience. A Chi-square test of goodness-of-fit was used to assess for equal distributions of responses. Simultaneous 95% confidence intervals (CI) for multinomial proportions were created. The free text was qualitatively analyzed based on themes.

**Results**: Of the 224 first-year osteopathic students, 207 students responded to the Likert scale questions and 113 responded to the free text. Students *strongly agree* or *somewhat agree* that the vPE was a fair assessment of their knowledge of OMM lab material (90.82%) and optimally assessed their procedural OMM skills (86.96%). Students *strongly agree* that the vPE better assessed their OMM lab knowledge than a written multiple-choice examination (73.91%) and they received helpful feedback during the vPE (77.78%).

**Conclusion**: Survey results support that the vPE was perceived by students to be an effective and fair alternative to the sPE. The creative use of a pair of pants and a prop sacrum was validated, as students confirmed that the vPE optimally assessed their procedural skills given the practical's limitations.

## Introduction

Osteopathic manipulative medicine (OMM) practical examinations (PEs) are important for assessing osteopathic medical students' cognitive knowledge and psychomotor skills required for

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osteopathic manipulative treatment (OMT).<sup>1</sup> PEs typically takes place in-person where students are assigned a student partner with whom they share the roles of patient and physician for examination purposes. However, in the response to the COVID-19 pandemic, first-year medical students were no longer allowed to participate in a standard in-person PE (sPE) in December 2020. Of note, the students had experienced a sPE prior to the COVID-19 adaptations.

How can the students' procedural skills in OMM be assessed if they can no longer be assessed in person?

One option considered was to substitute the sPE for a written multiple-choice exam (MCE). This option had been actualized in the past during the initial COVID-19 related restrictions; however, there were numerous concerns that we had hoped to avoid. The students regularly take bi-weekly written MCEs that assess their declarative knowledge; however, these same MCEs do not allow students to demonstrate their understanding of how to physically perform OMT. Furthermore, these exams fail to capture the numerous nuances associated with patient simulations, including but not limited to, communication with the patient or how to professionally approach a patient, and MCEs do not routinely assess psychomotor skills.<sup>2</sup>

To provide the most similar reproduction of the sPE experience, the virtual PE (vPE) was re-structured to be completed over telecommunications via Zoom. As we could not rely upon students having partners readily available during the campus closure, it was

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determined we would instead need to rely on props as our "body doubles." With these props, namely a pair of pants, students were able to demonstrate techniques performed on the lower extremities, innominate bones, and sacrum. They were instructed to verbalize their maneuvers in detail, explain how they found the landmarks, discuss how they arrived at a diagnosis; and demonstrate treatment of the somatic dysfunctions. The students were provided with detailed videos, demonstrating a mock vPE with explanations on how to use props, along with a Q&A discussion board and personal meetings to answer student inquiries about expectations.

The grading rubric was adapted from prior sPEs to accommodate new expectations for a vPE. Following the completion of the vPE, the OMM faculty deemed the grade distribution and class averages as comparable to past sPE that covered the same material. Our study survey aimed to determine if the vPE was perceived by the students as a successful and efficacious alternative to the sPE.

#### **Methods**

After the first-year class of 224 osteopathic students (graduating class of 2024) completed their vPE, an administrative email from the DMU OMM department was sent out to gather anonymous, voluntary student feedback regarding their perception and experience of the vPE. The survey consisted of 5 Likert scale questions. Corresponding to each 5-distinct statement, students responded to the following question: **On a scale of strongly disagree to strongly agree, to what extent do you agree with the following statements?** 

The five statements included:

- 1. The virtual practical was a fair assessment of my knowledge of the OMM lab material.
- 2. I believe the virtual practical better assessed my OMM lab material knowledge than a written multiple-choice examination.
- 3. Given the limitations of Zoom, the virtual practical optimally assessed my procedural OMM skills.
- 4. I received helpful feedback during my virtual practical.
- 5. I put significantly more time and effort into preparing for the virtual practical than I did preparing for the in-person practical.

Participants chose one of the following responses for each statement: *Strongly disagree, somewhat disagree, neither agree nor disagree, somewhat agree, or strongly agree.* A Chi-square test of goodness-of-fit was used to assess the equal distributions of different response categories. Simultaneous 95% confidence intervals (CI) for multinomial proportions were created using the function MultinomCI of package DescTools of R platform.<sup>4</sup>

The survey contained a free-text response question: What other suggestions would you have to improve the (virtual or live) practical experience?

The free-text question responses were categorized into common themes. Statements were able to have multiple themes.

IRB exemption was obtained from the institutional review board at Des Moines University College of Osteopathic Medicine (IRB ID 2021-2) on January 19th, 2021.

### Results

Of the 224 students in the graduating class of 2024, 207 students responded to the Likert scale questions with the results outlined in *Table 1.* 

Chi-square analysis used a power of 4 for statements S1, S2, S3 and S5 and used a power of 3 for S4 by combining *strongly disagree* and *somewhat disagree*.

Most students *strongly agree* or *somewhat agree* that the vPE was a fair assessment of their knowledge of OMM lab material (90.82%) and optimally assessed their procedural OMM skills (86.96%). Most students *strongly agree* that the vPE better assessed their OMM lab knowledge than a written multiple-choice examination (73.91%) and they received helpful feedback during the vPE (77.78%).

Regarding the free-text response asking for suggestions for improvement in the vPE, students' responses did not always provide suggestions. Of the 207 survey participants, 113 chose to respond to the free-text question; however, only 37 of those offered a true suggestion. Responses with true suggestions were the only responses analyzed into themes outlined in *Table 2*.

#### Comments

With the unique circumstances of the COVID-19 pandemic and requirement for social distancing, a new level of flexibility was necessary for the delivery of the medical school curriculum. It is important to know that a virtual alternative to the sPE is an acceptable means to monitor student retention, psychomotor skills, and proficiency of material taught. By assessing procedural psychomotor skills performed by a student, one is not only testing the students' knowledge needed to perform the procedure, but is also assessing the intelligently applied manipulation that it takes to perform the procedure.<sup>3</sup>

Our findings demonstrate that the students perceived the vPE as a fair and optimal assessment of their OMM knowledge and OMT skills learned in lab. Many benefits of the vPE remain preserved despite the lack of hands-on manipulation with a human body double. Students were instructed to explicitly verbalize their setup positions and the maneuvers they were performing, while physically demonstrating the position with props. The use of learner-generated visual explanations is a powerful learning tool in developing superior understanding compared to only creating verbal explanations.<sup>5</sup> This emphasis on learner-generated visual explanations in finding landmarks, the use of appropriate medical jargon to describe the vector forces applied to the tissues, as well

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#### Table 1: Frequency and Percent of Responses (n=207).

Results of the Likert-scale questions with distribution of participant response rate (%) and frequency (f). Goodness of fit Chi-square analysis for equal distributions of the five Likert scale questions p < 0.0001 for statements 1-4. (S1, 3.96E-52; S2, 1.41E-83; S3, 1.32E-41; S4, 1.44E-96; S5, 1.10E-12).

Question	S1: The virtu was a fair as of my knowl OMM lab ma	al practical sessment ledge of the aterial.	S2: I believe virtual pract assessed my material kno than a writt choice exam	the tical better OMM lab owledge en multiple- nination.	S3: Given the of Zoom, the practical op assessed my OMM skills.	e limitations e virtual timally y procedural	S4: I received helpful feedback during my virtual practical.		S5: I put significantly more time and effort into preparing for the virtual practical than I did preparing for the in-person practical.	
Statement Scale	%	f	%	f	%	f	%	f	%	f
Strongly Disagree	1.93%	4	1.45%	3	2.90%	6	0.97%	2	6.76%	14
Somewhat Disagree	3.86%	8	1.45%	4	5.31%	11	1.93%	4	19.32%	40
Neither Agree or Disagree	3.38%	7	5.80%	12	4.83%	10	3.38%	7	40.10%	83
Somewhat Agree	34.78%	72	16.91%	35	37.68%	78	15.94%	33	16.43%	34
Strongly Agree	56.04%	116	73.91%	153	49.28%	102	77.78%	161	17.39%	36
Total		207		207		207		207		207

#### Figure 1: Bar Chart of Survey Responses to 5 statements (n=207).

Results of the Likert-scale questions with distribution of participant response rate for each statement based on total of 207 responses. Simultaneous 95% confidence intervals (CI) for multinomial proportions were created for each response category.



On a scale of strongly disagree to strongly agree, to what extent do you agree with the following statements? 100.00% 90.00% 77.78% 80.00% 73.91% 70.00% **RESPONSE RATE** 60.00% 56.04% 49.28% 50.00% 40.10% 37.68% 40.00% 34.78% 30.00% 19.32% 20.00% 16.91% 15.94% 10.00% 0.00% S1. The virtual practical was a S2. I believe the virtual S3. Given the limitations of S4. I received helpful feedback S5. I put significantly more practical better assessed my zoom, the virtual practical during my virtual practical. time and effort into preparing fair assessment of my knowledge of the OMM lab OMM lab material knowledge optimally assessed my for the virtual practical than I material. than a written multiple choice procedural OMM skills. did preparing for the in person

STATEMENTS

Neither agree nor disagree

examination.

Somewhat disagree

Somewhat agree

practical.

Strongly disagree

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Table 2: The themes and subthemes of the free-text response (n=37). Themes include technical difficulties and suggestions for improvement for the vPE.

Theme	Subtheme	Frequency		
		%	f	
Technical difficult	16.2%	6		
Suggestions for improvement	Increase time	35.1%	13	
	Include human body double	29.7%	11	
	Requesting a review session prior to the vPE	21.6%	8	
	Request vPE format change	10.8%	4	
	Prop suggestion	2.7%	1	

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as the step-by-step instructions associated with different treatment types closely resembles the same vernacular of teaching. In this respect, student performance in the vPE assessed psychomotor skills, communication skills (which are intrinsically linked to the daily expectations of a physician<sup>6</sup>), as well as teaching skills. A major shortcoming of the vPE is that we cannot assess a student's diagnosis for correctness. We can assess their psychomotor skills and understanding of how they arrive to a diagnosis, but not the actual findings on the "patient."

Combining responses of *somewhat agree* and *strongly agree*, there is significant consensus (93.7%) that students received helpful feedback during their vPE. Feedback is important for the students perceived self-growth in physician related skills,<sup>7</sup> to promote positive and desirable development,<sup>8</sup> and for learning more about the student's true level of knowledge and skills.<sup>9</sup> The results demonstrate that individualized feedback was uncompromised during the vPE. Unique to PEs (vPE or sPE), compared to written examinations, is the individualized feedback that can consist of positive feedback and constructive criticism related to the nuances of executing OMT.

The majority of students did not *agree* nor *disagree* that they spent more time preparing for the vPE compared to the standard inperson PE. This suggests that the preparation time for the vPE is comparable to the sPE. It is ideal that a vPE does not impose unnecessary added time for preparation.

Considering how well received this vPE was for the focused areas of the LE and pelvis, it is conceivable that the virtual approach and use of props could translate to vPE for other body regions. Different props such as long-sleeved shirts, skeletons, and paper cut-outs could be used for other areas of the body. With the additional requirement of verbalizing their intentions, students' knowledge of many technique types, such as Facilitated Positional Release, Still technique, or others, can be assessed using a virtual model.

The most common suggestion to improve the vPE was to increase the testing time. The number of questions covered in the vPE was reduced to account for the increased time that students had to explain themselves. It is anticipated that time limits will be a barrier for a few students. Students commented on technical difficulties and slow internet connections. Encouragement to use wired connections may offer a solution. Zoom meetings can occasionally be difficult given only one person can talk at a time. Technological advancements with the use of virtual meetings and internet capacity may solve these issues in the near future. One student suggested stuffing the prop pair of pants to better simulate a body. Modifications like these might be appealing to those who wish to administer a vPE.

The clarity of PE questions has always been a topic of discussion among the department to actualize efficient testing of student knowledge. Limitations to this study include response bias and the limited number of true suggestions offered for improvement within the free-text response. Further research could investigate the optimal question style and question presentation that would offer the best clarity for students taking the vPE. Further research could also investigate if virtual examination processes have an impact on student use of OMT in their future.

## Conclusion

Developing psychomotor skills such as OMT does require actual hands-on practice, and we believe there is no substitute as effective for learning OMT than an in-person, hands-on approach. Likewise, sPEs are ideal; however, when there are limitations imposed on human proximity, such as was imposed during the COVID-19 pandemic, alternative assessments to monitor student proficiency and understanding of OMT is necessary. Our findings demonstrate that the students perceived the novel vPE as a fair and optimal assessment of their OMM knowledge and OMT skills learned in lab.

Survey results support that the vPE was an effective alternative to the sPE. Students overwhelmingly agree that the vPE was a fair assessment of their OMM lab material knowledge and it was perceived to be a better form of assessment than a written exam. The creative use of a pair of pants and a prop sacrum was validated as students confirmed that the vPE optimally assessed their procedural skills given the COVID-19 limitations.

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