

Capstone for Impact Submission | GY2020

Project Title: Teaching Musculoskeletal Anatomy through Yoga

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Branch: Diagnostics & Therapeutics

Path of Excellence: Global Health & Disparities

If this project can be continued by another UMMS student, please include your contact information or any other details you would like to share here:

Summary:

Experiential learning can offer a multi-modal dimension to obtaining and synthesizing information. A survey of first-year medical students demonstrated that students prefer incorporating multiple learning styles, rather than learning exclusively with one (Lujan, 2006).

At the University of Michigan Medical School (UMMS), the first-year musculoskeletal anatomy curriculum has been centered on cadaveric dissection, small-group teaching sessions, lectures, and peer teaching. For this diverse curriculum, a next step in experiential learning may include the opportunity for students to use their own bodies to understand muscle attachments and actions.

Yoga is an ancient mind-body exercise that engages various muscle groups through specific postures called asanas. The ability of yoga poses to isolate muscles through stretch and contraction offers a unique modality for students to explore musculoskeletal (MSK) anatomy and remember key concepts through direct experience.

This CFI project focuses on the development and implementation of a curriculum for teaching musculoskeletal anatomy through yoga within the M1 Musculoskeletal sequence.

Methodology:

A yoga-based anatomy workshop was developed and taught by the first author, who is a certified yoga instructor and a medical student who had completed the first-year MSK anatomy curriculum prior to workshop development. The yoga-based workshop focused on muscles of the extremities with emphasis on attachment sites and muscle actions, and followed the instructional model described below.

1. Students were cued into poses that stretched the muscles/muscle groups being discussed, allowing for identification of where the muscle was located
2. Using a human skeleton model and a scarf, the proximal and distal attachments of each muscle/muscle group were visualized, leading into discussion on key actions

3. Finally, students were cued into poses that contracted the muscle/muscle group and demonstrated the key actions previously discussed

Evaluation of the workshop's impact and value was measured across four domains, described below.

1. Immediate educational impact was measured with a five-question multiple-choice quiz was administered immediately before and after the session
2. Intermediate-term educational impact was measured with three conceptual multiple-choice questions on the MSK sequence quiz and exam in the week following the session
3. Participant confidence in their knowledge of musculoskeletal anatomy was assessed with a retrospective pre-post survey was administered immediately after the session, and participants were asked to evaluate their confidence with MSK anatomy using a Likert-type scale
4. Participants' self-perceived well-being was assessed with a retrospective pre-post survey was administered immediately after the session and participants were asked to (1) evaluate their well-being using a Likert-type scale and (2) qualitatively describe their mental state

The workshop was delivered as a 90-minute in-person session in 2018 and 2019. In Fall 2019, this session was developed into a BlueLink video series to ensure sustainability after the author's graduation.

Results:

Regarding short-term knowledge acquisition, post-workshop quiz scores improved compared to pre-workshop scores. For intermediate knowledge retention, students who attended the session performed better on the three questions emphasizing session concepts ($p < 0.02$), while there was no significant difference in overall course performance between the two groups ($p > 0.13$). Finally, the retrospective pre-post survey of workshop attendees showed an increase in mean confidence in knowledge and an improved mean state of well-being following the workshop. The majority of students who completed the survey agreed or strongly agreed that the session was valuable.

Conclusion:

Overall, the results of this study support the conclusion that the Anatomy through Yoga sessions were effective—both in teaching anatomy and in positively impacting well-being— and were found to be of value by students. These findings suggest that movement-based teaching of musculoskeletal anatomy may provide a valuable adjunct to a traditional Musculoskeletal anatomy curriculum that is embedded in an integrated, organ systems-based medical school curriculum. Primary findings indicated that workshop attendance was associated with improved short-term and intermediate-term retention of key MSK material taught in the workshop, as well as improved confidence in knowledge of this material. Although students self-selected into the workshop by choice, the finding of no difference in performance on overall MSK examination or mid-year cumulative performance supports a direct effect of the workshop on the study results, rather than intrinsic differences between the groups of students who did and did not attend a session.

Given the nature of the musculoskeletal system and the ease with which most students can engage with their own anatomy in the learning process, there is great potential for benefit from formalizing this opportunity for kinesthetic learning. Next steps include exploring possibilities for sustainably incorporating this session into the MSK course curriculum, either by creating videos or a standardized lesson plan. Systematizing a method for experiencing musculoskeletal anatomy unfold in our own bodies, such as the practice of select yoga poses coupled with the visual demonstration of muscle attachments on a skeleton model, can offer a forum for discussion among peers, a more nuanced understanding of what various muscle actions mean, and the chance to make anatomy education alive and personally relevant.

Reflection/Impact Statement:

You may use the following questions to guide your reflection:

1. How did the process of conducting this research confront any limitations of your prior thinking?
2. Who could potentially benefit from this CFI project over different timescales and how?
3. What actions will you take afterwards to continue the momentum of this project, and maximise the likelihood of the identified benefits being achieved?
4. What advice would you give to another student completing their CFI?

Before I move into this reflection, I want to begin with a statement of gratitude to all those who walked with me through the process of turning my abstract idea of using yoga as a learning tool for anatomy into a tangible, effective educational product. In order of their involvement: Hanna Saltzman, Heather Wagenschutz, Whitney Townsend, Sandra Hearn, Kathleen Alsup, Emily Ginier, Patrick Bridge, Beth Holman, Suzy McTaggart, and Alyssa Sullivan, as well as all my friends and family whose encouragement and faith in this project gave it life and value.

This project is particularly significant to me because it represents a pedagogical structure in which learners have agency within their education (when provided with institutional support). I am first a yoga practitioner, and then a yoga teacher. In my M1 year, it was natural for me to use yoga to study musculoskeletal anatomy, alongside my friend and classmate Hanna Saltzman. The effectiveness of that approach sparked an idea that felt novel and empowering, especially at a point in my M1 year where I felt that my education was happening to me rather than by me or for me. To apply my skillset as a yoga instructor in designing an MSK Anatomy through Yoga session meant that my identities as a medical student and yoga teacher could be synergistically integrated. Moving through the design and successful execution of these sessions challenged my thinking that there is a hierarchical power structure between learners and instructors – rather, these roles are dialectic, and maybe education can be a process that transpires in multidirectional exchange. And, you don't have to be at the top of your class to be an effective teacher – in fact, maybe the challenges I faced as an M1 learner enhanced my ability to thoughtfully parse apart and relay movement-based anatomy education.

My CFI project immediately benefitted the two classes of M1 students who attended my teaching sessions in 2018 and 2019. As the Anatomy through Yoga video series is finalized and published on YouTube via the UM BlueLink channel, it has the potential to benefit not only current and future UMMS students, but learners across the world who come upon this resource.

At this exact point in time, I will ensure that the videos published on YouTube are a high-quality educational tool. I would also like to explore the possibility of scholarly assessment and evaluation of the video resource. Although I will be graduating soon, I would like to set up the infrastructure for this project and leave it under the care of the Anatomy Department, with possible ongoing involvement as my residency schedule permits.

As I think about the advice I would offer to another student completing their CFI, I would like to emphasize the process-oriented benefit of the exercise. In my CFI, I worked under my mentors to develop methods to assess the effectiveness of the session. While we obtained encouraging results, our attempts to publish this was unsuccessful, by and large because it was a new foray into the finer details of medical education research for all of us. Despite the as of yet unpublished manuscript, I gained a great deal from moving through the process of project conception, design, execution, and analysis. It was not perfect, but has left me with a good understanding of what I know and what I don't know, and what gaps I should fill when undertaking such an endeavor again. The lessons learned from minor setbacks (I hesitate to use the word failure mostly because I'm still so proud of my process and outcome) are strengths as I seek to continue building my own skills and perspectives on medical education.