Tutorial

An introduction to clinical simulation (CS) for orofacial myologists: COVID-19's impact on clinical education

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AN INTRODUCTION TO CLINICAL SIMULATION (CS) FOR OROFACIAL MYOLOGISTS: COVID-19'S IMPACT ON CLINICAL EDUCATION

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ABSTRACT

COVID-19 has forced educational institutions to increasingly rely on technology to provide appropriate clinical experiences for students. Simulations and case studies have been used for decades, but COVID-19 thrust these resources into the forefront of clinical education. Clinical simulation (CS) is the use of alternative methods in the clinical preparation of students (American-Speech-Language-Hearing Association [ASHA], 2020). Forms of CS include simulators, standardized patients, virtual patients, digital mannequins, immersive reality, task trainers, and computer-based interactive experiences and often incorporate case studies (ASHA). This article draws upon clinical education in the primary certification fields for those who practice orofacial myofunctional therapy: speech-language pathology and dentistry. It is designed to be a CS primer for these clinicians by presenting types of simulation-based learning, experiences specific to orofacial myofunctional disorders (OMDs), advantages and disadvantages, supporting evidence, best practices, and enhancement of critical thinking skills. There is a need to increase the representation of OMD-related content in CS experiences.

KEY WORDS: clinical simulation, orofacial myofunctional disorders, COVID-19, clinical education

INTRODUCTION

COVID-19 has challenged most individuals to live and work differently, including how to provide opportunities for students to meet their clinical clock hour requirements to satisfy the demands of accrediting and certifying bodies. When the first major shutdown in the United States occurred in mid-March, 2020, clinical educators were thrust into a situation where they had to quickly and creatively meet these demands so that students could graduate on schedule, or with as little delay as possible. The American-Speech-Language-Hearing Association's (ASHA's) Council for Clinical Certification (CFCC) in Audiology and Speech-Language Pathology has so far not reduced the clinical clock hour requirements for students during COVID-19, meaning training programs have had to look into alternative ways of helping students obtain their clinical experiences amid the upheaval of public and

private school closures and medical facilities severely limiting access to sites where thousands of students were engaged in clinical practica. There were disruptions in clinical services, which yielded problems for students pursuing their clock hours. Clinical simulation (CS) became a critical vehicle to facilitate the continued clinical education of students, while mitigating COVID-19 transmission rates. CS is one of the safest forms of clinical skills practice, since a physical presence in the clinical environment and direct patient contact are not needed (Barabari & Moharamzadeh, 2020). ASHA (2020) defines CS as the use of alternative methods to fulfill clinical education requirements. CS often features case studies and includes simulators, standardized patients, virtual patients, digital mannequins, immersive reality, task trainers, and computer-based interactive experiences (ASHA).

CS was already being used by many university training programs as a means for student clinicians in speech-language pathology and the dental health professions to develop their clinical knowledge and skills and earn the required clock hours for graduation, certification, and licensure. ASHA's CFCC (2020) allows a graduate student to use up to 150 hours through CS; this is a simple explanation, as there are additional stipulations contingent upon the student's undergraduate background. Programs that prepare dental hygienists and dentists have an even longer, much more established history with CS, which may be a factor in the Commission on Dental Accreditation (CODA) affording dental schools and education programs temporary flexibility during COVID-19 (2020). The individual programs are to determine what constitutes

sufficient patient experiences for students, which may include the use of CS (CODA). Given the disruptions and problems with the provision of services to school students and patients in medical facilities, clinical educators embraced CS to help bridge the clock hour requirements. Simucase and Master Clinician Network, major providers of CS and guided observations in speech-language pathology, respectively, reported impressive surges in their site traffic during the initial months of the pandemic. The increased use of these services is staggering and is presented in figures 1 through 4. Figure 1 compares Simucase website traffic in spring 2019 and spring 2020 along several parameters. The spring 2020 data reveal a substantial increase in website traffic, when COVID-19 became a significant factor.

Figure 1. Simucase website traffic comparison, spring 2019 to spring 2020 (Johnson, 2020)

Figure 2 presents the number of students participating in Master Clinician Network's guided observations in 2017 through 2020. Data was collected by Master Clinician Network, using their website traffic, for the first and second quarters of each year. The first

quarter's (Q1's) duration is January 1 through March 15, and the second quarter's (Q2's) duration is from March 16 through July 28. The heavy vertical line indicates the major onset of COVID-19 in the United States. Master Clinician Network typically experiences

increased use across the semester, with higher levels of student participation and guided observations in the latter half of the semester (Fischer, 2020). For example, in 2019, the number of guided observations increased by 189% from January 1 through March 15, compared to March 16 through July 28 (Fischer). Similar increases were observed in 2018, at 178%, and 2017, at 199%. However,

in 2020, the increase was quite notable, at 422% (Fischer).

Figure 3 presents the number of guided observation hours for the same time covered in Figure 2. Again, the numbers increase dramatically for Q2 of 2020, as depicted in the far-right bar.

Figure 2. Student participation in Master Clinician Network, 2017-2020 (Fischer, 2020)

Figure 3. Guided observation hours by students via Master Clinician Network, 2017-2020 (Fischer, 2020)

Figure 4 portrays the increase from Q1 of each year to Q2, for 2017 through 2020. The left bars of each year indicate the percentage increase in student participation, while the right bars indicate the percentage increase in guided observation hours. For 2017 through 2019, the numbers are rather constant. The average percentage increase for student participation from 2017 through 2019 is 72.6%,

while the average increase for guided observation hours is 188.8% during this same time. In 2020, there is a significant increase in both parameters. The percentage increase for student participation in 2020 is 184.4%, and the percentage increase for guided observation hours in 2020 is 421.7%. COVID-19 is inferred to be the reason behind the significant increase of 2020's data.

Figure 4. Student participation in and guided observations via Master Clinician Network, first quarter to second quarter, 2017-2020 (Fischer, 2020)

TYPES OF CS-BASED LEARNING AND OMD-RELATED EXPERIENCES

CS assumes various forms, and case studies are commonly incorporated into these

technologies. Case studies, alone, may be used for guided observation. Types and explanations of CS are provided in Table 1.

Table 1. Types of Clinical Simulation

Clinical Simulation Type	Description
Simulated/Standardized patients	Individuals are trained to act as patients and portray symptoms, problems, and conditions.
Virtual patients	Digitally animated 2D and 3D figures in a virtual environment are rendered and manipulated to perform by computers in real time.
Digital mannequins	High-fidelity simulators are programmed to exhibit a range of clinical symptoms and other real-life functions.
Immersive reality	An environment is created where projectors are directed to multiple walls of a room-sized cube. An instructor or computer controls the actions of objects or images on the screen.
Task trainers	Specialized simulator or models are designed to help the learner practice a specific skill that requires repetition to learn.

Note. Table was created using information from ASHA (2020), LSU Health Shreveport (2020), and Williams et al. (2013).

SimuCase and Master Clinician Network Specific offer finished simulations and case studies, respectively, that are relevant to OMDs. Their libraries specifically include content related to dysphagia, feeding, and orofacial hypotonia. Zimmerman (2016) presents a series of case studies that pair undergraduates in speech-language pathology and dental students to understand the relationships between oral conditions and speech development. These case studies focus on missing teeth, ankyloglossia, and tongue thrust and may include actors and three-dimensional models. Tools are also available to create your own simulations and case studies. These include SmartSparrow, SecondLife, Kynectiv: DecisionSim, Virtual Human Toolkit, iHuman, Virtual Case Creator, WebSP, AvatarKinect, X-box Kinect (SDK) (Williams et al., 2013). Of course, technology expands rapidly, and other tools and programs

are available. Innovations to create simulated experiences will certainly emerge.

ADVANTAGES AND DISADVANTAGES OF CS

CS has many advantages that are relevant during the COVID-19 Pandemic. Simulations are highly accessible, eliminating geographical and time constraints. The cases are standardized and engaging. CS also incorporates problem-based learning, which pairs well with OMDs. They can be reviewed on-demand, meaning students need not feel ashamed or embarrassed for repeated viewings. Student clinician confidence can be bolstered (Howells et al., 2019; Vaughn, 2001), while anxiety can be reduced. CS offers a way to mitigate the challenges associated with the shortages of clinical placement opportunities

that university training programs are experiencing. Foundational clinical skills can be practiced virtually, avoiding risks to patient safety.

In professions where human interaction is vital, it is important to ask: What are the disadvantages of clinical simulations? Reflective student comments identified some negative aspects of CS, or at least ways it can be improved, including (1) unrealistic portrayal of the time commitment in CS, compared to time obligations during real-life diagnostic sessions; (2) idealistic situations, not real-world ones; (3) predictability of patients in CS, compared to the unpredictable nature of actual children and adults; and (4) the limited scope of information presented in a case study, compared to the broader scope often obtained through real-life interactions (Ellis, 2017). To help combat these perceived disadvantages, it would be helpful for CS to be used in a manner that promotes and builds upon real-life clinical experiences with patients and their caregivers. After all, CS is not just technology. Rather, it is a comprehensive set of tools that requires the human components of design and feedback to enhance the clinical preparation of students.

EVIDENCE AND BEST PRACTICES RELATED TO CS

Evidence from the fields of speech-language pathology, medicine, nursing, physical therapy, dentistry, and other health professions supports the use of CS in clinical education (Boese et al., 2013; Cook et al., 2011; Decker et al., 2013; Hayden et al., 2014; Singh et al., 2013; Watson et al., 2012). Within these disciplines, Cook et al. analyzed the effectiveness of simulations in clinical training using a meta-analysis of over 600 articles and found that “in comparison with no intervention, technology-enhanced simulation training in health professions education is consistently associated with large effects for outcomes of knowledge, skills, and behaviors and moderate effects for patient-related outcomes” (p. 978).

According to the Academic and Clinical Education Task Force of the Council of Academic Programs in Communication

Sciences and Disorders (CAPCSD, 2019), research is limited, but preliminarily supportive for CS. This task force concluded that a dozen studies support the use of task trainers, standardized patients, or computerized-based scenarios as clinical education tools (Alanazi et al., 2016; Alanazi et al., 2017; Benadom & Potter, 2011; Estis et al., 2015; Hill et al., 2013; Lieberth & Martin, 2005; Naeve-Velguth et al., 2013; Potter & Allen, 2013; Syder, 1996; Ward et al., 2015; Zraick, 2002; Zraick et al., 2003). The task force surmised that students demonstrated increases comfort levels with various techniques and gained introductory knowledge for working with patients presenting an array of disorders. Additional studies promote the use of CS in speech-language pathology in relation to assessment of foundational clinical skills, clinical placements, and general benefits to critical stakeholders (Hill et al., 2014; Jansen, 2014; Sheepway et al., 2011).

A chief goal of CS is to foster critical thinking skills in learners, and this can be achieved with clinical educators who are highly skilled and guide their learners through feedback. Williams et al. (2013) offer guidance as to the experiences that should surround the CS. The four pillars of CS-based education are presented in Figure 5. The three critical activities in Figure 6 are comprised of a prebrief session, an introduction, and a debrief, with debriefing being the very essence of CS. ASHA (2020) heavily emphasizes debriefing, and Williams et al. describe it as the most essential component to promote effective learning in CS experiences. The importance of debriefing has been further highlighted by several other studies (Aldrich, 2009; Fanning & Gaba, 2007; Issenberg et al., 2005; Rall et al., 2000; Savoldelli et al., 2006). In fact, Savoldelli et al. (2006) found that simulation experiences where instructors do not engage in a constructive debriefing yields little benefit to the students. The Association of Standardized Patient Educators (ASPE) provides a model of best practices regarding CS on its website:

<https://www.aspeducators.org/assets/docs/ASPE%20SOBP%20Infographic.pdf>.

Figure 5. Four Pillars of CS-Based Education (based on Williams et al., 2013)

Figure 6. Critical activities of CS (based on ASHA, 2020, and Williams et al., 2013).

CONCLUSION

This article is intended to provide an overview of CS and to increase involvement of orofacial myologists in CS experiences for students in speech-language pathology and the dental health fields, as well as clinicians working towards certification in orofacial myology. Specific to OMDs, more case studies and simulations need to be developed and reviewed by orofacial myologists to ensure that (1) the discipline continues to use evidence-based, innovative training mechanisms for its future clinicians and (2) OMDs are increasingly represented and accurately depicted, diagnosed, and treated in CS. Those individuals who provide training courses in orofacial myology would serve themselves and their learners well by developing standardized patients via CS that overcome some of the barriers to traditional instruction that include geography, expense, and time. Clinician-educators who create CS experiences can

expand their outreach of knowledge and training possibilities involving OMDs.

Resources for planning CS are available from the Society for Simulation in Healthcare.

Simulations can be expensive for individuals to create, but orofacial myologists may consider partnering with companies that specialize in speech-language pathology and dentistry CS.

CS has played a significant role in altering the landscape of clinical preparation, across health professions. COVID-19 heavily increased the reliance on CS in speech-language pathology and dentistry. Ultimately, the goal of clinical education is to ensure that learners establish, build, and expand their clinical knowledge, skills, and talents. CS can aid in this endeavor. CS can serve as a precursor, such that face-to-face clinical experiences, where observation requirements can be fulfilled and preliminary, foundational experiences for actual face-to-face patient-clinician interactions can be added to a learner's repertoire.

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