ADVANCING THROUGH INNOVATION



Practice of local anesthesia applications in 3D environment during the COVID-19 pandemic

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1 | PROBLEM

The development of clinical competence requires the assimilation of large amounts of knowledge in combination with the acquisition of clinical skills and problem-solving abilities. The simulation allows students to repeat procedures until they demonstrate acceptable skill levels, without compromising patients, while still gaining procedural skills. In line with advances in technology, digital simulations are being developed to support the acquisition of the necessary psychomotor skills prior to actual clinical applications.¹

After the declaration of the pandemic, the learning process in educational institutions was left to e-learning, and it was necessary to apply all the resources provided by digital technology in order to provide students with the best possible distance education.^{2,3}

2 | SOLUTION

Due to the impossibility of conducting conventional classes for learning local anesthesia, which was based on exercise on plastic models and jawbones, we decided to provide students with education via a mobile platform. The study involved 11 fourth-year students in 5-year schooling at the Department of Dentistry, Faculty of Medicine University of Pristina. They used a mobile simulator in Serbian (Dental Simulator v1.13 for iOS and Android—English, Brazilian, and Spanish also available) over a mobile phone

during a pandemic from their home (Figure 1). Through the "Simulation" mode, students are able to simulate the procedure of Maxillary Infiltration and Inferior Alveolar Nerve Block (IANB) anesthesia in a 3D environment, with feedback. The educator followed the educational process through the "University Mode" application, which recorded all the attempts and mistakes of the students during the 3D simulation (Figure 2).

3 | RESULTS

To evaluate the learning process, we used an electronic satisfaction questionnaire (Google Forms) using the Likert scale with 5 offered answers (Figure 3). All respondents (100%) believe (agree and strongly agree) that the application helped them to better understand the techniques of local anesthesia and that it can be of great help in learning in other disciplines. When performing IANB, the position of the mandibular foramen should be found three-dimensionally in relation to oral anatomical structures, so another advantage of this type of 3D simulation is that the human brain functions on the principle of images and associations, it absorbs content the fastest and easiest if the content is placed through images, respectively through visual experience. Feedback from the application also reflected in the importance of aspiration before local anesthesia and possible complications as a consequence of injection into a blood vessel. After the positive results of this study, we plan to continue with the research. We want

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FIGURE 1 Simulation of local anesthesia in a 3D environment



FIGURE 2 Student performance throughout attempts (University Mode)

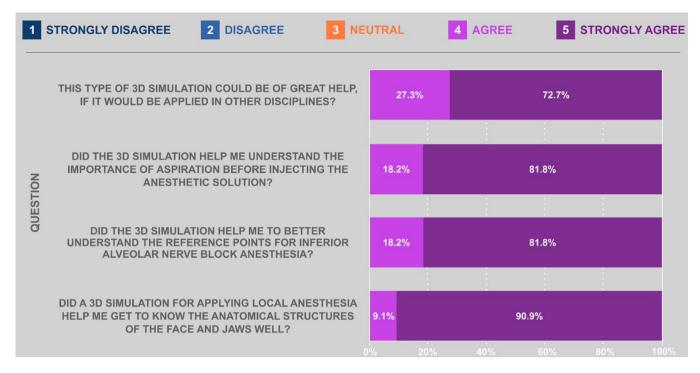


FIGURE 3 Student satisfaction with 3D simulation

to examine the effects of this type of simulation on clinical parameters when students are administrating local anesthesia on a patient.

Mobile learning plays a big role today in education, especially having in mind the fact that the daily use of mobile phones is growing day by day. The advantage of mobile learning is reflected in the ability to learn at your own pace and it is financially more profitable because no additional training tools are needed. Mobile devices can provide innovative and interactive ways of presenting materials; therefore, simulation should be used in combination with conventional learning. As a means of self-management, it can provoke a positive response in students and can further motivate them, and it finds a special place in e-learning during emergencies or in remote areas. ^{4,5}

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CONFLICT OF INTEREST

Authors state no conflict of interest.

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