Computerized-Aid Medical Training:
Ecographic Simulator For Echo-Guided Infiltration Of Botulinic Toxin

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ABSTRACT

The application of new technologies in training environments allows the development of new teaching modalities that enable knowledge and ability acquisition in healthcare professionals. Simulation has proven to be an effective method to favor and improve learning as well as to attain the necessary skills to perform a specific technique with greater reliability and security for the patient. We present a new tool or technological development in medical training, through an ultrasound simulator, valid for the knowledge and necessary ability acquisition in the proper infiltration of botulinum toxin guided by ultrasound. This tool benefits from the advantages that new technologies bring when applied in medical training, offering a virtual setting, comfortable and accessible, that does not require the user to move or have access to an ultrasound machine, allowing ultrasound explorations without the existence of a real patient.

Keywords: *Botulinum Toxin, Echography, e-Learning, Information Technology, Medical Training, Simulation*

DOI: 10.4018/jitr.2014040104

INTRODUCTION

Healthcare professionals must have an adequate degree of knowledge, competencies and clinical abilities to ensure proper quality patient care (Feng, 2013). Patient security is considered one of the main pillars in quality healthcare (Okuda, 2009). It is therefore necessary, before performing a specific technique or medical procedure, to have reached an ample experience level through a proper and adequate training plan (Cook, 2013). Nowadays, it is not acceptable that the first invasive technique which can harm a real patient, be carried out by a professional with no prior experience or necessary training (Okuda, 2009).

The acquired knowledge and abilities through clinical practice are essential in the training of healthcare professionals (Feng, 2013; Weller, 2012). There is a need for an improvement in training to increase the level of skill acquisition for better healthcare quality and reduce potential iatrogenic adverse effects (Autry, 2013).

Besides the knowledge of different techniques or clinical abilities, medical training should aim to achieve an adequate management and control in the practice of each one of them (Okuda, 2009). Teaching programs should include training plans for the acquisition of an adequate skill and dexterity level to carry out the different techniques and medical procedures (Autry, 2013; Sperling, 2013).

Therefore, with the advancement in medicine, medical training must explore new training models to adapt to the needs of healthcare professionals today (Carpenter, 2013; Cook, 2013; Mehta, 2013; Okuda, 2009). Although there is no evidence that continued training improves patient care, it is considered a key requirement in current medical practice (Okuda, 2009). Healthcare education or training should provide and include ample studies and adequate clinical experiences for training doctors (Feng, 2013; Weller, 2012).

Given its potential benefits, the use of new technologies in medical training might be considered appropriate to respond to new and greater needs that current medical training must face (Diessl, 2010; Harris, 2013; Mehrdad, 2011; Mehta, 2013; Smolle, 2010); they facilitate the development of new teaching modalities that improve the knowledge and skills of healthcare professionals (Mehrdad, 2011; Mehta, 2013).

New technologies, specifically e-learning and simulation have proven to be valid and useful teaching methodologies for the acquisition of these clinical skills with numerous and potential advantages (Autry, 2013; Carpenter, 2013; Cook, 2013; Diessl, 2010; Evgeniou, 2012; Feng, 2013; Harris, 2012; Le Beux, 2007; Lewis, 2014; Mariani, 2012; Mehrdad, 2011; Mehta, 2013; Okuda, 2009; Ruiz, 2006; Shearer, 2013; Smolle, 2010; Sperling, 2013; Weller, 2012).

They allow the creation of an environment without workload pressure, where repetitive practice can be done, mistakes tolerated and corrected to favor the acquisition of the corresponding abilities with greater realiability and security for the patient (Autry, 2013; Okuda, 2009; Sperling, 2013). Amongst its main advantages we highlight its flexibility in space and time (Autry, 2013; Carpenter, 2013; Feng, 2013; Mariani, 2012; Mehrdad, 2011). This is relevant and essential since nowadays the time dedicated to medical training has been considerably reduced due to the service needs or demands, as a result of the increased care load (Autry, 2013; Carpenter, 2013; Feng, 2013; Mehta, 2013; Okuda, 2009; Weller, 2012).

The flexibility that these new training methodologies show (e-learning and simulation) can therefore ease this saturation and time reduction for training (Carpenter, 2013; Lewis, 2014; Mehta, 2013; Weller, 2012). Nowadays it is necessary to facilitate an effective learning tool to compensate the time reduction in medical training (Okuda, 2009; Weller, 2012). Moreover, a tool that allows a specific repetitive clinical practice, to achieve the necessary skill before it is used on patients (Lewis, 2014; Weller, 2012).

Thus, we present a new medical training tool through an ultrasound simulator, to facilitate theoretical and practical knowledge