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## USING TELEMENTORING TO TRAIN LARYNGOSCOPY TO MEDICAL STUDENTS IN HANOI, VIETNAM FROM OMAHA NEBRASKA, USA

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### Abstract

The use of a direct laryngoscope can lead to obstructed views of the airway, resulting in misplacement of the endotracheal tube. Advancements in telemedicine have resulted in the development of the video laryngoscope, an instrument which utilizes video technology in order to obtain a clearer view of the glottic opening. These two intubation techniques were compared by training students to use the instruments via distance communication. After training, 100% of the students successfully intubated a mannequin using the video laryngoscope and 75% of the students successfully intubated a mannequin using the direct laryngoscope. These results indicate that distance communication can be used to train and mentor students in medical procedures, and improve quality of patient care.

**Keywords:** Telemedicine; telementoring; tele-intubation.

### Introduction

Airway management is a fundamental medical skill that is commonly performed by direct laryngoscopy whereby a direct view of the glottic opening is obtained by aligning the oral, pharyngeal and laryngeal axis. New technology offers improved methods of viewing the glottic opening by using a video camera on the tip of a laryngoscope (video laryngoscope), allowing the intubator to obtain an indirect view of the glottic opening, obviating the need to attempt to create a direct line of sight from the opening of the mouth through the glottic open-

ing.<sup>1,2,3</sup> This demonstration study taught students how to perform both direct and indirect laryngoscopy and to intubate a manikin using an audiovisual connection between two sites. The Center for Advanced Technology and Telemedicine (CATT) in Omaha, Nebraska and the Hanoi Medical University, Hanoi, Vietnam.

### Method

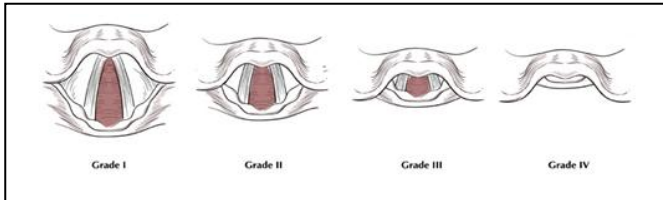
After IRB approval, an audiovisual link using Vidyo, a HIPPA secure conferencing program (Vidyo, Inc., Hackensack, NJ) was established between the Center for Advanced Technology and Telemedicine (CATT) in Omaha, NE, USA and the Hanoi Medical University (HMU), Vietnam. Eight medical students at HMU were instructed via telementoring by an instructor at CATT in how to perform an intubation.

After receiving instruction, students performed two intubations on an airway mannequin. One intubation was done using a standard #3 Macintosh direct laryngoscope and another using a Karl Storz video laryngoscope with a #3 Macintosh blade. The order of the direct or indirect intubations was performed in a random order. Students were timed in how long it took to perform the intubation.

The Cormack/Lehane (C/L) view (Figure 1) of the glottis opening observed by the student was recorded.<sup>4</sup> After completing the intubation, a bronchoscope (linked to the Vidyo program by a Karl Storz C CAM and C HUB) was placed in the endotracheal lumen and advanced under telementoring by an anesthesiologist at CATT. Proper endotracheal tube placement was confirmed by visualization of the tracheal rings. An additional confirmation of correct tube placement was performed by an instructor on site in Hanoi. Success or

non-success for each intubation was recorded. Teaching was done in English. The Vietnamese medical students spoke English as a second language.

**Figure 1.** Illustration of the Cormack, Lehane views of the glottic opening as seen during laryngoscopy.



## Results

For the eight students, the average C/L score was 1.6 during direct line of vision intubation compared to 1.4 when using video laryngoscopy. Students were successful in direct intubation 75% of the time compared to 100% successful intubation when using video laryngoscopy. On average, students completed the intubation in 39.3 seconds when using the direct laryngoscope, compared to 59.1 seconds when using the video laryngoscope.

## Discussion

This study demonstrated that a telementoring link using Vidyo could be successfully established between the University of Nebraska Medical Center in Omaha, NE and Hanoi Medical University in Hanoi, Vietnam and used for skills training. Intubation was successfully taught to Vietnamese medical students in Hanoi, Vietnam by an instructor in Omaha, NE, USA. Language barriers did not preclude the students in successfully learning how to intubate the mannequin. Transmission of bronchoscopic images of endotracheal tube placement to the instructor at the UNMC was a successful method to document proper endotracheal tube placement. This pilot study demonstrates that complex tasks can be successfully taught by telementoring over large distances and across cultural barriers. This method of telementoring for complex medical tasks may be useful for developed world training institutions to share knowledge in a cost effective fashion with developing world training partners.

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**Conflict of Interest.** The authors declare no conflicts of interest.

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