

Mannequin Evaluation of 3D-Printed Intermittent Oro-Esophageal Tube Guide for Dysphagia

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Abstract : Dysphasia is difficulty in swallowing food because of oral cavity impairments induced by stroke, muscle damage, tumor. Intermittent oro-esophageal (IOE) tube feeding is one of the well-known feeding methods for the dysphasia patients. However, it is hard to insert at the proper position in esophagus. In this study, we design and fabricate the IOE tube guide using 3-dimensional (3D) printer. The printed IOE tube is tested in a mannequin (Airway Management Trainer, Co., Ltd., Copenhagen, Denmark) mimicking human's esophagus. The gag reflex point is measured as the design point in the mannequin. To avoid the gag reflex, we design various shapes of IOE tube guide. One structure is separated into three parts; biting part, part through oral cavity, connecting part to oro-esophageal. We designed 6 types of IOE tube guide adjusting length and angle of these three parts. To evaluate the IOE tube guide, it is inserted in the mannequin, and through the inserted guide, an endoscopic camera successfully arrived at the oro-esophageal. We had planned to apply this mannequin-based design experience to patients in near future.

Keywords : dysphagia, feeding method, IOE tube guide, 3-D printer

Conference Title : ICBE 2016 : International Conference on Biomedical Engineering

Conference Location : Paris, France

Conference Dates : June 20-21, 2016