Increasing access to medical training with 3D printing: the endotracheal intubation model

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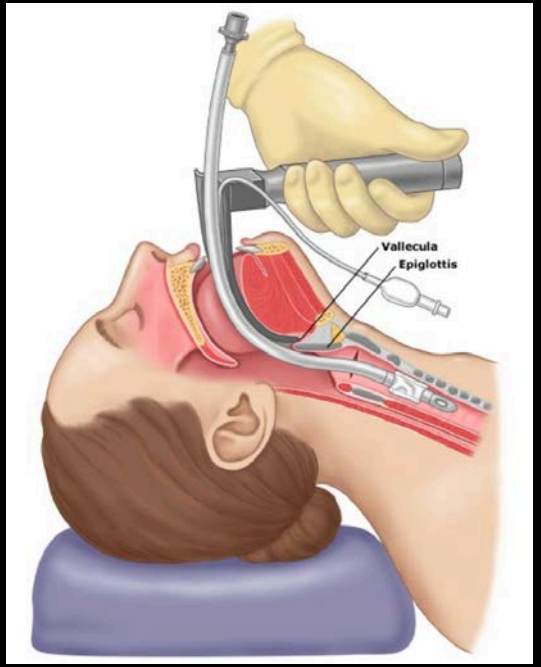
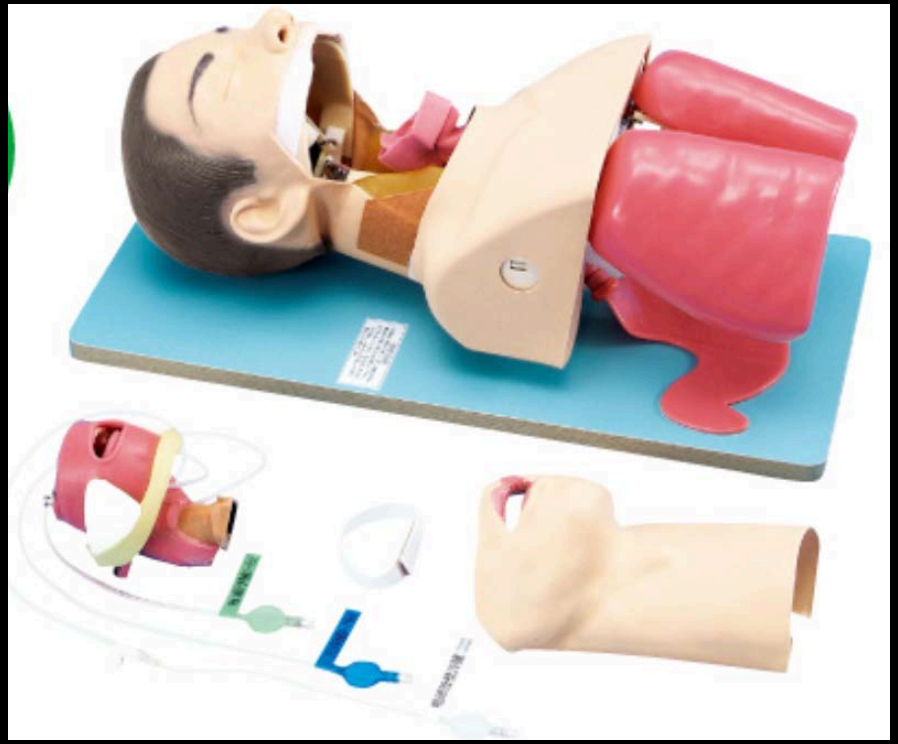
Endotracheal Intubation (ETI)

What is **endotracheal intubation**?

- major component of advanced airway management
- Tube inserted into trachea to maintain airway and/or to administer drugs
- Learning curve associated with performing successful endotracheal intubation
- Unsuccessful ETI or >2 failed attempts may lead to health complications and/or death



Current ETI Simulation Models



- Practice for medical trainees is **essential but limited**
- Simulation models to practise ETI are very expensive (pictured model: $7812.50)
- Similar **3D printed model** can be acquired for fraction of the price

3D Modelling and Printing

- ETI Model created using web accessible anatomical parts from **SOURCE**
  - CT Scans converted into 3D models
- Parts were modified and assembled using Meshlab, Blender, Autocad

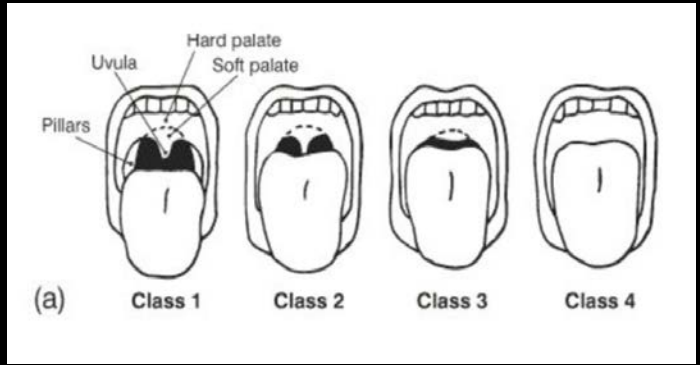
Results

- pictured: ETI model
- Printed by: Makerbot Replicator 2x with dual extrusion
- Filaments used:
  - Dissolvable and ABS (outer aspects of model)
  - Dissolvable and NinjaFlex (soft tissue)
  - Limonene solution used to remove the dissolvable support filaments required during print

Clinical Impact

- Growing commercialization and increasing availability of 3D printers
- ETI model would be available on open platform to be produced by any 3D printer
- Address barriers to medical education through increased accessibility to this training tool to improve clinical practice

Future Steps



- Currently designing modifiable parts for the model to simulate various levels of challenging airways, as determined by the Mallampati score

- View and download current printable tracheal, tibial and other models here: www.openmedx.com/3d-printing