Supplementary Table 1. Emergency airway management and the gum elastic bougie: Summary of the literature review

| **Reference** | **Study design** | **Country** | **N** | **Setting/simulation model** | **Participants** | **Exposure/intervention group** | **Control group** | **Primary outcome(s)** | **Main findings** | **LOEa** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | Observational | USA | 1594 | Prehospital | All patients undergoing prehospital ETI | BAETI | Non-BAETI | ETI success rate on first attempt | Significantly higher success rate in BAETI group (77%) than non-BAETI group (70%) | 2B |
| 28 | Observational | Finland | 781 | Prehospital | Anesthesiologists | BAETI | Non-BAETI | ETI success rate on first attempt | Significantly higher success rate in BAETI group (98.2%) than non-BAETI group (85.7%) | 2B |
| 29 | RCT | USA | 757 | ED | All patients undergoing ETI in ED | BAETI | Non-BAETI | ETI success rate on first attempt | Significantly higher success rate in BAETI group (96%) than non-BAETI group (82%) | 1B |
| 30 | Observational | USA | 543 | ED | All patients undergoing ETI in ED | BAETI | Non-BAETI | ETI success rate on first attempt | Significantly higher success rate in BAETI group (95%) than non-BAETI group (86%) | 2B |
| 31 | RCT | USA | 1102 | ED and ICU | All patients undergoing ETI in ED and ICU | BAETI | Non-BAETI | ETI success rate on first attempt | Similar success rates in BAETI (80.4%) and non-BAETI (83.0%) groups | 1B |
| 32 | Simulation | Japan | 209 | Normal airway model | Medical students | BAETI | Non-BAETI | Median maximum forces applied on tongue and incisors during laryngoscopy | Significantly lower tongue and incisor forces applied during laryngoscopy in the BAETI group *vs* non-BAETI group | 5 |
| 33 | Simulation | Australia | 26 | DAM model | Residents | BAETI | Non-BAETI | ETI success rate and mean time to complete ETI | Similar success rates between BAETI (100%) and non-BAETI (92.9%) groups. Significantly longer time to completion in the BAETI group | 5 |
| 34 | Simulation | Canada | 103 | DAM model | Residents | BAETI | Non-BAETI (fiberoptic stylet) | ETI success rate and mean time to complete ETI | Similar success rates (Cormack grade IIIA) and mean times to completion between BAETI and fiberoptic stylet groups. Significantly lower success rate (Cormack IIIB) and significantly longer mean time to completion in the BAETI group *vs* fiberoptic stylet group | 5 |
| 35 | Simulation | USA | 35 | DAM model | Paramedics, nurses, emergency residents | BAETI | Non-BAETI | ETI success rate and mean time to complete ETI | Significantly higher success rate in BAETI group (94%) than non-BAETI group (77%). Similar mean times to completion between the two groups | 5 |
| 36 | Simulation | USA | 96 | DAM model | Paramedics | BAETI | Non-BAETI | ETI success rate | Similar success rates between BAETI (71.9%) and non-BAETI (66.7%) groups. | 5 |
| 37 | Simulation | USA | 21 | DAM model | Emergency medicine residents and emergency physicians | BAETI | Non-BAETI | Median time to complete ETI | Similar median times to completion between BAETI (76 s) and non-BAETI (64 s) groups | 5 |
| 38 | Simulation study | UK | 25 | ETI via intubating laryngeal mask | Anesthesiologists | Blind ETI using GEB | Fiberscope-guided ETI | ETI success rate | Significantly lower ETI success in blind ETI using GEB compared with fiberscope-guided technique | 5 |
| 39 | Observational | USA | 6938 | ED | All patients undergoing ETI in ED | Augmented direct laryngoscopyb | Video laryngoscopy | ETI success rate on first attempt | Significantly lower success rate in augmented direct laryngoscopyb group (81.1%) than video laryngoscopy group (90.9%) | 2B |
| 40 | Observational | USA | 625 | ED | All pediatric patients (age <16 years) undergoing ETI in ED | Augmented direct laryngoscopyb | Video laryngoscopy | ETI success rate on first attempt | Significantly lower success rate in augmented direct laryngoscopyb group (74.5%) than video laryngoscopy group (84.0%). | 2B |
| 41 | Simulation | Japan | 17 | CPR model | Residents | BAETI | Non-BAETI | ETI success rate and median time to complete ETI | Significantly higher success rate in BAETI group (96.0%) than non-BAETI group (72.0%). Similar median times to completion between the two groups | 5 |
| 42 | Simulation | Japan | 16 | Infant CPR model | Anesthesiologists | BAETI | Non-BAETI | ETI success rate and median time to complete ETI | Significantly higher success rate in BAETI group (100%) than non-BAETI group (75.0%). Shorter median time to completion in BAETI group than non-BAETI group | 5 |
| 43 | Simulation | Turkey | 40 | CPR model | Residents | BAETI | Non-BAETI | ETI success rate on first attempt | Significantly higher success rate in BAETI group (96%) than non-BAETI group (75%) | 5 |
| 44 | Simulation | Turkey | 52 | CPR model | Medical students | BAETI | Non-BAETI | ETI success rate on first attempt | Similar success rates in BAETI and non-BAETI groups | 5 |
| 45 | Simulation | USA | 20 | CPR model | Emergency physicians | BAETI | Non-BAETI | Median time to complete ETI | Significantly longer median time to completion in BAETI group *vs* non-BAETI group | 5 |
| 46 | Simulation | Turkey | 38 | Moving/ stationary ambulance | Paramedics and paramedic students | BAETI | Non-BAETI | Mean time to complete ETI | Significantly longer mean time to completion in BAETI group than non-BAETI group in both moving and stationary ambulances | 5 |
| 47 | Observational | USA | 3004 | Prehospital | All patients with cardiopulmonary arrest undergoing prehospital ETI | BAETI | Non-BAETI | ETI success rate on first attempt | Similar success rates between BAETI (53.1%) and non-BAETI (42.8%) groups | 2B |
| 48 | Simulation | USA | 21 | Ovine model | Residents and medical students | BACT | Non-BACT (rapid four-step technique) | Median time to complete surgical airway | Significantly shorter median time to completion of surgical airway in BACT group (67 s) *vs* non-BACT group (149 s) | 5 |
| 49 | Simulation | USA | 23 | Ovine model | Emergency medicine residents | BACT | Non-BACT (traditional cricothyroidotomy) | Median time to complete surgical airway | Significantly shorter median time to completion of surgical airway in BACT group (118 s) *vs* non-BACT group (183 s) | 5 |
| 50 | Simulation | UK | 26 | Porcine laryngeal model | Anesthesiologists | BACT | Non-BACT (Surgicric 2® and Melker kit®) | Median time to complete surgical airway | Significantly shorter median time to completion of surgical airway in BACT group *vs* the two other non-BACT groups | 5 |
| 51 | Simulation | UK | 26 | Obese porcine laryngeal model | Anesthesiologists | BACT | Non-BACT (traditional cricothyroidotomy) | Median time to complete surgical airway | Similar median time to completion of surgical airway in BACT group (84 s) *vs* non-BACT group (85 s) | 5 |
| 52 | Simulation | USA | 12 | Normal airway model | Paramedics and nurses | BACT | Non-BACT (traditional cricothyroidotomy) | Median time to complete surgical airway | Significantly shorter median time to completion of surgical airway in BACT group (52.1 s) *vs* non-BACT group (87.3 s) | 5 |
| 53 | Simulation | Singapore | 28 | Porcine laryngeal model | Anesthesiologists | BACT | Non-BACT (Melker kit®) | Median time to complete surgical airway | Significantly shorter median time to completion of surgical airway in BACT group (45.2 s) *vs* non-BACT group (101.3 s) | 5 |
| 54 | Simulation | Australia | 43 | Ovine model | Anesthesiologists, emergency physicians, and ICU physicians | BACT | Needle cricothyroidotomy using 14-gauge needle | Median time to complete surgical airway | Significantly longer median time to completion of surgical airway in BACT group (90 s) *vs* needle cricothyroidotomy group (65 s) | 5 |
| 55 | Simulation | Australia | 35 | Ovine model (impalpable front-of-neck anatomy) | Anesthesiologists | BACT | Non-BACT (traditional cricothyroidotomy) | Median time to complete surgical airway | Significantly longer median time to completion of surgical airway in BACT group (113 s) *vs* non-BACT group (96 s) | 5 |
| 56 | Simulation | Norway | 20 | Porcine laryngeal model | Anesthesiologists | BACT | Non-BACT (Portex™ cricothyroidotomy Kit) | Success rate of surgical airway | Significantly higher success rate of surgical airway in BACT group (95%) *vs* non-BACT group (60%). Higher tracheal injury rate in non-BACT group (60%) compared with BACT group (0%) | 5 |
| 57 | Simulation | Slovenia | 23 | Porcine model | Anesthesiologists | BACT | Needle cricothyroidotomy using 14-gauge needle | Maintenance of arterial oxygen saturation >90% 5 min after surgical airway | Significantly higher rescue oxygenation success rate in BACT group (83%) *vs* needle cricothyroidotomy group (18%) | 5 |
| 58 | Simulation | Israel | 50 | ETI on high-fidelity simulator while wearing PPE | Military physicians and paramedics | BAETI | Non-BAETI | ETI success rate and mean time to complete ETI | Lower success rate (82% *vs* 100%) higher mean time to completion (43.6 s *vs* 23.1 s) in BAETI group *vs* non-BAETI group while wearing PPE | 5 |
| 59 | Simulation | Japan | 15 | Infant difficult airway model | Anesthesiologist | BAETI | Non-BAETI | ETI success rate and median time to complete ETI | Significantly higher success rate in BAETI group (53%) than non-BAETI group (6.7%). Shorter median time to completion in BAETI group than non-BAETI group | 5 |
| 60 | Simulation | Japan | 17 | Pierre Robin manikin (congenital difficult airway model) | Anesthesiologist | BAETI | Non-BAETI | ETI success rate and median time to complete ETI | Significantly higher success rate in BAETI group (100%) than non-BAETI group (65%). Shorter median time to completion in BAETI group than non-BAETI group | 5 |
| 61 | Simulation | Turkey | 46 | Simulated selective lung ventilation | Emergency physicians | BAETI | Non-BAETI | Mean time to the first successful ventilation | Significantly longer mean time to ventilation for both right and left lung in BAETI group *vs* non-BAETI group | 5 |
| 62 | Simulation | Japan | 16 | Normal and vomitus settings | Residents | BAETI | Non-BAETI | Median time to complete ETI | GEB use significantly lengthened the median intubation time in direct laryngoscope, Pentax-AWS Airwayscope®, and McGRATH® MAC groups in the normal setting, but significantly shortened the intubation time with all three laryngoscopes in the vomitus setting | 5 |

aLOE according to the Oxford Centre for Evidence-Based Medicine [63].

bOptimized direct laryngoscopic view by maneuvers such as optimal external laryngeal manipulation, upright or ramped positioning, or GEB use.

BACT, bougie-assisted emergency surgical cricothyrotomy technique; BAETI, bougie-assisted endotracheal intubation; CPR, cardiopulmonary resuscitation; ED, emergency department; ETI, endotracheal intubation; GEB, gum elastic bougie; DAM, difficult airway management; ICU, intensive care unit; LOE, level of evidence; PPE, personal protective equipment; RCT, randomized controlled trial; s, seconds; vs, versus.