CLAIMS

1. A balloon dilator system, comprising:

a hand piece comprising an attachment mechanism for removably coupling to a proximal end of an endoscope;

a hole in a lateral side of the handpiece for inserting a distal end of a balloon catheter including an inflatable balloon; and

a hollow guide tube distally extending from the hand piece, a proximal end of the hollow guide tube configured to receive the balloon catheter when inserted through the hole and guide the balloon catheter such that the distal end of the balloon catheter exits a distal end of the hollow guide tube,

wherein the hollow guide tube is flexible and includes a curved distal end configured to couple to a flexible distal end of the endoscope, and the flexible distal end of the endoscope follows the curvature of the hollow guide tube when coupled to the curved distal end of the hollow guide tube.

2. The balloon dilator system of claim 1, further comprising: the balloon catheter, wherein the balloon catheter comprises a marking proximal to the balloon to endoscopically approximate a distance to insert the balloon catheter into an esophagus prior to inflating the balloon.

3. The balloon dilator system of claim 1, wherein the hand piece comprises a pump handle that, when actuated, pumps pressurized fluid to inflate the inflatable balloon.

4. The balloon dilator system of claim 3, wherein the hand piece further comprises: a pressure gauge configured to measure pressure of the pressurized fluid that is pumped to inflate the inflatable balloon; and a control that, when actuated, releases pressure and deflates the inflatable balloon.

5. The balloon dilator system of claim 4, further comprising: the endoscope.

6. The balloon dilator system of claim 1, further comprising: a removable insert configured to removably couple the flexible distal end of the endoscope to the curved distal end of the hollow guide tube, the removable insert comprising a first channel groove for removably coupling to the flexible distal end of the endoscope, and a second channel groove

for removably coupling to the curved distal end of the hollow guide tube, wherein the removable insert is configured to conform to the curvature of the hollow guide tube.

7. The balloon dilator system of claim 1, wherein the attachment mechanism is a levered top down ratchet attachment mechanism for removably coupling the hand piece to a proximal end of an endoscope.

8. A balloon dilator system, comprising:

a balloon pump hand piece configured to pump pressurized fluid through a flexible tube to inflate an elongate inflatable balloon, the balloon pump hand piece comprising: an attachment mechanism for removably coupling the balloon pump hand piece to a rigid proximal end of an endoscope;

the flexible tube, wherein the flexible tube is configured to be in fluid communication with and connected to the balloon pump hand piece at a first end of the flexible tube, and the elongate inflatable balloon at a second end of the flexible tube;

a hollow inner cannula separated from the balloon pump hand piece, the hollow inner cannula comprising a first opening at its proximal end and a second opening at its distal end, the first opening configured to receive a flexible distal end of the endoscope that is advanced until a tip of the flexible distal end of the endoscope exits the second opening of the hollow inner cannula; and

the elongate inflatable balloon, wherein the elongate inflatable balloon is external to and circumferentially attached to the hollow inner cannula between the proximal end of the hollow inner cannula and the distal end of the hollow inner cannula.

9. The balloon dilator system of claim 8, wherein the balloon pump hand piece further comprises: a pressure gauge configured to measure pressure of the pressurized fluid that is pumped to inflate the inflatable balloon; and a control that, when actuated, releases pressure and deflates the inflatable balloon.

10. The balloon dilator system of claim 8, wherein the balloon pump hand piece further comprises a connection at a base of the balloon pump hand piece, the connection configured to fluidically couple to the first end of the flexible tube.

11. The balloon dilator system of claim 8, further comprising: a removable stopper configured to be placed on the hollow inner cannula proximal to the inflatable balloon to stabilize the balloon dilator system during inflation of the inflatable balloon.

12. The balloon dilator system of claim 11, wherein the removable stopper comprises a spring and lateral projections that are squeezable to activate the spring and release the stopper.

13. The balloon dilator system of claim 8, wherein a patient can breathe through the hollow inner cannula when the endoscope is not inserted into the hollow inner cannula and the inflatable balloon is inflated.

14. The balloon dilator system of claim 8, further comprising: a tracheostomy tube configured to slide over the flexible tube and hollow inner cannula.

15. The balloon dilator system of claim 14, wherein the tracheostomy tube comprises:

a first inflation port;

a second inflation port; and

a shaft comprising a distal balloon configured to be inflated via the first inflation port, and a proximal balloon configured to be inflated via the second inflation port to a higher pressure than the distal balloon is inflated via the first inflation port.

16. The balloon dilator system of claim 15, wherein:

the distal balloon is configured to be advanced within a tracheal lumen of a patient and inflated via the first inflation port; and

the proximal balloon is configured to be advanced within a tracheal stoma of the patient and inflated via the second inflation port to dilate the tracheal stoma.

17. The balloon dilator system of claim 8, wherein the attachment mechanism is a levered top down ratchet attachment mechanism for removably coupling the hand piece to a proximal end of an endoscope.

18. The balloon dilator system of claim 8, wherein the balloon pump hand piece further comprises a pump handle that, when actuated, pumps the pressurized fluid through the flexible tube.

19. An endoscopic tracheal balloon dilator system, comprising:

a flexible tube configured to be in fluid communication with a fluid pump at a first end of the flexible tube, and an elongate inflatable balloon at a second end of the flexible tube;

a hollow inner cannula coupled to the flexible tube, the hollow inner cannula comprising a first opening at its proximal end and a second opening at its distal end, the first opening configured to receive a distal end of an endoscope that is advanced until a tip of the distal end of the endoscope exits the second opening of the hollow inner cannula; and

the elongate inflatable balloon, wherein the elongate inflatable balloon is external to and circumferentially attached to the hollow inner cannula between the proximal end of the hollow inner cannula and the distal end of the hollow inner cannula, the elongate inflatable balloon is configured to be positioned within and dilate a tracheal stoma of a patient, and the patient can breathe through the hollow inner cannula when the endoscope is not inserted into the hollow inner cannula and the inflatable balloon is inflated.

20. The endoscopic tracheal balloon dilator system of claim 19, further comprising: a tracheostomy tube configured to slide over the flexible tube and hollow inner cannula.

21. The balloon dilator system of claim 7, wherein the levered top down ratchet attachment mechanism is integrated on a top side of the hand piece and comprises a housing with an elongated open channel to removably couple the endoscope in a top-down manner.

22. The balloon dilator system of claim 20, wherein housing comprises:

vertically spaced ridges for receiving respective transverse slots of a rigid proximal attachment segment of the endoscope; and

a retractable interior protuberance located on the interior side surface of the open channel for engaging a longitudinal groove of the rigid proximal attachment segment of the endoscope.

23. The balloon dilator system of claim 1, wherein the attachment mechanism is an insert ratchet attachment mechanism integrated on a top side of the hand piece.

24. The balloon dilator system of claim 22, wherein the insert ratchet mechanism comprises an external housing with a channel including opening and exit apertures through which the endoscope can be inserted, the housing including a retractable interior

protuberance configured to engage a transverse slot of the endoscope to secure the endoscope in place, the retractable interior protuberance configured to be actuated by an external housing button.