

CLAIMS

1. A delivery device to deliver a tubular instrument into a catheter extending distally from a catheter adapter, the delivery device comprising:
 - a housing configured to couple to the catheter adapter;
 - the tubular instrument configured to insert through the catheter, the tubular instrument comprising a distal end, a proximal end, and a lumen extending between the distal end and the proximal end, wherein the distal end comprises a distal tip, wherein the distal tip is closed, wherein a portion of the distal end proximate the distal tip comprises a first material, wherein the distal tip comprises a second material, wherein a durometer of the first material is greater than a durometer of the second material, wherein the tubular instrument is configured to advance distally with respect to the housing; and
 - a stiff member disposed within the tubular instrument, the stiff member comprising a lateral surface, wherein at least a portion of the lateral surface of the stiff member contacts the inner wall, from the distal end to the proximal end, of the tubular instrument.
2. The delivery device of claim 1, wherein the tubular instrument comprises a plurality of holes within the distal end and proximal to the distal tip.
3. The delivery device of claim 2, wherein the plurality of holes comprises a first hole and a second hole proximal to the first hole, wherein a diameter of the first hole is larger than a diameter of the second hole.
4. The delivery device of claim 2, wherein the plurality of holes are staggered.
5. The delivery device of claim 2, wherein the plurality of holes comprises a first hole and a third hole aligned in a direction perpendicular to the longitudinal axis of the tubular

- instrument and a second hole and a fourth hole aligned in a direction perpendicular to the longitudinal axis of the tubular instrument, wherein the diameter of the first hole is equal to a diameter of the third hole, wherein the diameter of the second hole is equal to a diameter of the fourth hole.
6. The delivery device of claim 2, wherein each of the plurality of holes is rectangular, wherein a length of each of the plurality of holes is parallel to a longitudinal axis of the tubular instrument, wherein a width of each of the plurality of holes is perpendicular to the longitudinal axis of the tubular instrument.
7. A delivery device to deliver a tubular instrument into a catheter extending distally from a catheter adapter, the delivery device comprising:
- a housing configured to couple to the catheter adapter;
 - the tubular instrument configured to insert through the catheter, the tubular instrument comprising a distal end, a proximal end, and a lumen extending between the distal end and the proximal end; and
 - an elongated stiff member disposed within the tubular instrument, wherein the stiff member comprises a first material, wherein the distal end comprises a second material, wherein a durometer of the first material is greater than a durometer of the second material, wherein the tubular instrument is configured to advance distally with respect to the housing.
8. The delivery device of claim 7, wherein the distal end of the tubular instrument comprises a distal opening and a distal-most portion of the distal end comprises a flap, wherein the flap is configured to fold over a tip of the elongated stiff member extending through the distal opening.

9. The delivery device of claim 7, wherein the distal end of the tubular instrument comprises an insert, wherein the insert comprises a distal opening and a distal-most portion of the insert comprises a flap, wherein the flap is configured to fold over a tip of the elongated stiff member extending through the distal opening.
10. The delivery device of claim 7, wherein the elongated stiff member is configured to be retracted from the tubular instrument.
11. The delivery device of claim 7, wherein the elongated stiff member comprises a wire surrounded by a spring and a rounded distal end.
12. A delivery device to deliver a tubular instrument into a catheter extending distally from a catheter adapter, the delivery device comprising:
 - a housing configured to couple to the catheter adapter; and
 - the tubular instrument configured to insert through the catheter, the tubular instrument comprising a distal end, a proximal end, and a lumen extending between the distal end and the proximal end, wherein the distal end comprises a distal tip, wherein the distal tip is closed, wherein the distal end further comprises a first annular layer and a second annular layer, wherein the first annular layer is disposed within the second annular layer, wherein the first annular layer comprises a first material, wherein the second annular layer comprises a second material, wherein the first material has a greater durometer than the second material.
13. The delivery device of claim 12, wherein a thickness of the second annular layer is greater than a thickness of the first annular layer at a first position along a length of the tubular instrument, wherein the thickness of the second annular layer is the same as the

- thickness of the first annular layer at a second position along the length of the tubular instrument, wherein the second position is proximal to the first position.
14. The delivery device of claim 12, wherein the thickness of the second annular layer is less than the thickness of the first annular layer at a third position along the length of the tubular instrument, wherein the third position is proximal to the second position.
 15. A delivery device to deliver a tubular instrument into a catheter, the delivery device comprising:
 - a housing configured to couple to the catheter adapter; and
 - the tubular instrument configured to insert through the catheter, the tubular instrument comprising a distal end, a proximal end, and a lumen extending between the distal end and the proximal end, wherein the distal end comprises a distal tip, wherein the distal tip is closed, wherein the distal end further comprises an annular wall, wherein the annular wall comprises a first annular section and a second annular section distal to the first annular section, wherein a durometer of the first annular section is greater than a durometer of the second annular section.
 16. The delivery device of claim 15, wherein the first annular section comprises a first material, wherein the second annular section comprises a second material, wherein a durometer of the first material is greater than a durometer of the second material.
 17. The delivery device of claim 16, wherein a thickness of the first annular section is greater than a thickness of the second annular section.
 18. The delivery device of claim 15, wherein the annular wall comprises a third annular section between the first annular section and the second annular section, wherein the third annular section is proximate the first annular section and the second annular section.