CLAIMS

1. An apparatus, comprising:

an expandable sheath comprising:

a cylindrical or substantially cylindrical expandable frame having a proximal opening, a distal opening, an inner surface, and an outer surface; and

a material covering the outer surface of the expandable frame and a portion of the inner surface of the expandable frame, and forming a step feature within the distal opening, the step feature having a first surface that abuts the inner surface of the expandable frame and that is oriented at a first angle relative to the inner surface of the expandable frame;

a dilator comprising:

a cylindrical or substantially cylindrical body;

a tapered tip comprising at least a first tapered section; and

an interlock between the body and the tapered tip having a first cylindrical section with a first outer diameter, a second cylindrical section with a second outer diameter that is less than the first diameter, and a catch surface that abuts the first cylindrical section and that is oriented at a second angle relative to the first cylindrical section; and

wherein the dilator is configured to be inserted into the expandable sheath through the proximal opening of the expandable frame; and

wherein the catch surface is configured to engage the first surface to resist the body of the dilator from passing out of the expandable frame through the distal opening.

2. The apparatus of claim 1, further comprising:

a sheath hub configured to secure the expandable sheath proximate to the distal opening of the expandable frame; and

a dilator hub comprising:

a dilator insert mold configured to secure the body of the dilator;

a spring configured to engage the dilator insert mold, and resist movement of the dilator insert mold within the dilator hub; and

one or more latches configured to lock the dilator hub to the sheath hub.

3. The apparatus of claim 1, wherein the tapered tip further comprises a second tapered section that abuts the second cylindrical section of the interlock.

4. The apparatus of claim 3, wherein the material covering the outer surface of the expandable frame and a portion of the inner surface of the expandable frame further comprises a tapered inner edge at a distal end of the expandable sheath, the tapered inner edge being configured to engage the second tapered section of the tapered tip when the catch surface of the interlock is in engagement with the first surface of the sheath.

5. The apparatus of claim 1, wherein the first angle is ninety degrees.

6. The apparatus of claim 1, wherein the first angle is less than ninety degrees.

7. The apparatus of claim 1, wherein the second angle is ninety degrees.

8. The apparatus of claim 1, wherein the second angle is less than ninety degrees.

9. The apparatus of claim 1, wherein the step feature has a radial height of between 0.1 mm and 5 mm.

10. The apparatus of claim 1, wherein the material is a polymer.

11. The apparatus of claim 10, wherein the material is thermoplastic polyurethane.

12. The apparatus of claim 1, wherein the expandable frame is a braided material.

13. The apparatus of claim 12, wherein the braided material comprises strands of nitinol.

14. The apparatus of claim 1, wherein the expandable sheath further comprises a coating applied to the expandable frame and the material.

15. The apparatus of claim 14, wherein the coating is a lubricious coating.

16. The apparatus of claim 1, wherein the interlock is formed of stainless steel.

17. The apparatus of claim 16, wherein the interlock is coated with a polymer.

18. The apparatus of claim 1, wherein the interlock is formed of a polymer.

19. The apparatus of claim 1, wherein the tapered tip is formed of a polymer.

20. The apparatus of claim 18, wherein the tapered tip is formed of polyether block amide.

21. The apparatus of claim 1, wherein the tapered tip further comprises a second tapered section being proximal of the first tapered section,

wherein the first tapered section of the tapered tip decreases in diameter in a distal direction, and the second tapered section decreases in diameter in a proximal direction, and

wherein a distal end of the sheath further comprises a chamfered, rounded, or filleted inner edge configured to overlap at least a portion of the second tapered section of the tapered tip of the dilator when the catch surface of the interlock is in engagement with the first surface of the sheath.

22. The apparatus of claim 21, wherein the second tapered section comprises a chamfer, and the distal end of the sheath comprises a complementary chamfered inner edge.

23. The apparatus of claim 21, wherein the second tapered section is filleted, and the distal end of the sheath comprises a complementary rounded inner edge.

24. The apparatus of claim 21, wherein the second tapered section is rounded, and the distal end of the sheath comprises a complementary filleted inner edge.

25. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath is textured with a cross-hatched pattern.

26. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath is textured with a knurled pattern.

27. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath is textured with a dimpled pattern.

28. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath is textured with a pattern of dashed or continuous parallel lines.

29. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath is textured with a pattern of dashed or continuous curvilinear lines.

30. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath is textured with a pattern of dashed or continuous saw-toothed lines.

31. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath comprises one or more recessed grooves.

32. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath comprises one or more raised grooves.

33. The apparatus of claim 1, wherein at least a portion of an inner surface at the distal end of the sheath has a lubricious coating.