CLAIMS

What is claimed is:

1. A delivery catheter for delivering a device to a native valve of a patient's heart, comprising:

   a flexible tube having a main lumen and a control wire lumen;

   a plurality of links disposed in a distal region of the flexible tube;

   wherein each link is aligned with and connected to at least one adjacent link with a slot formed between each pair of adjacent links;

   wherein a top portion of each link is narrower than a bottom portion of each link when the links are viewed from a side;

   wherein each link includes an orifice at the bottom of the link;

   wherein each link includes at least one slit, wherein the slit begins at the orifice and extends upward along at least a portion of the link; and

   a control wire in the control wire lumen that is connected to the plurality of links, wherein applying tension to the control wire causes the distal region of the flexible tube to bend.

2. The delivery catheter of claim 1, wherein each link is connected to at least one adjacent link only at a bottom portion of the links.

3. The delivery catheter of any of the preceding claims, wherein the top portions of the links are drawn closer together when tension is applied to the control wire to bend the distal region.

4. The delivery catheter of claim 3, wherein a coil sleeve surrounding a portion of the control wire prevents buckling of a proximal region of the delivery catheter.

5. The delivery catheter of claim 3, wherein the plurality of links are in a straight configuration when tension is removed from the control wire.

6. The delivery catheter of any of the preceding claims, wherein the flexible tube further comprises a polymer coating.

7. The delivery catheter of any of the preceding claims, wherein the flexible tube further comprises a polyether block amide coating.

8. The delivery catheter of any of the preceding claims, wherein the plurality of links are comprised of at least one of a shape memory material, stainless steel, or a polymer.

9. The delivery catheter of any of the preceding claims, wherein the flexible tube comprises a ring distal to the plurality of links, and the control wire is fixedly attached to the ring.

10. The delivery catheter of claim 9, wherein the ring is connected to a distal end link of the plurality of links.

11. The delivery catheter of claim 9, wherein at least a portion of a distal end link is connected to the ring by a portion at the top of the flexible tube that extends in a direction distal to the distal end link.

12. The delivery catheter of claim 9, wherein the control wire is connected to the ring by welding.

13. The delivery catheter of any of the preceding claims, wherein the control wire is moveably coupled to the flexible tube by a ring at a location proximal to the plurality of links.

14. The delivery catheter of claim 13, wherein the ring comprises a tube fixedly attached to the top of the ring, and the control wire is moveably coupled to the ring by passing through the tube.

15. The delivery catheter of any of the preceding claims, wherein the links are cut from a single tube.

16. The delivery catheter of any of the preceding claims, wherein the links are cut from a single flat sheet of material that is rolled to form the links.

17. The delivery catheter of any of the preceding claims, further comprising:

    a first ring in the distal region of the flexible tube; and

    a second ring in the distal region of the flexible tube that is spaced apart from the first ring;

    wherein the plurality of links is disposed in the distal region of the flexible tube between the first ring and the second ring.

18. The delivery catheter of any of the preceding claims, further comprising a coil sleeve disposed in the control wire lumen around the control wire.

19. The delivery catheter of claim 18, wherein the coil sleeve extends proximally from the distal region of the flexible tube such that a portion of the control wire that extends from a second ring to a first ring is not covered by the coil sleeve.

20. A sheet for forming into a flexible catheter tube, the sheet comprising:

    a flat sheet; and

    a plurality of spaced apart aligned cutouts each having a central portion between two end portions, wherein a width of the central portion of each cutout is wider than the width of the two end portions of each cutout;

    wherein the cutouts form a corresponding plurality of spaced apart aligned strips each having a central portion and two end portions; wherein a width of the central portion of each strip is narrower than the width of the two end portions of each strip;

    wherein the spaced apart aligned strips each have a second cutout along a first edge of the flat sheet;

    wherein each of the spaced apart aligned strips comprises at least one slit which begins at the second cutout and extends toward a center of the aligned strip; and

    wherein the sheet is configured to be rolled into a substantially cylindrical shape having a plurality of links with a slot formed between each pair of adjacent links, a bottom orifice for each link, and at least one slit extending upward from the bottom orifice, wherein top portions of the links correspond to the central portions of the strips, bottom portions of the links correspond to the end portions of the strips, the bottom orifices correspond to the second cutouts, and a side of the substantially cylindrical shape corresponds to ends of the slits.

21. The sheet of claim 20, wherein each of the spaced apart aligned strips comprises a third cutout along a second edge of the flat sheet, and wherein each of the spaced apart flat strips comprises another slit that begins at the third cutout, and wherein the bottom orifices further correspond to the third cutouts aligning with the second cutouts.

22. The sheet of any of claims 20-21, where the sheet is made from a shape memory material.

23. The sheet of any of claims 20-22, wherein the cutouts are laser cut.

24. A method of making a flexible catheter tube, comprising:

providing a flat sheet;

cutting a plurality of spaced apart aligned cutouts in to the sheet, each cutout having a central portion between two end portions, wherein a width of the central portion of each cutout is wider than the width of the two end portions of each cutout and wherein the cutouts form a corresponding plurality of spaced apart aligned strips each having a central portion and two end portions; wherein a width of the central portion of each strip is narrower than the width of the two end portions of each strip;

cutting a plurality of cutouts along a first edge of the flat sheet such that each edge of the aligned strips has a corresponding cutout along a first edge of the sheet;

cutting a plurality of slits, wherein each slit begins at one of the cutouts along the first edge and extends toward a center of the aligned strip; and

rolling the sheet into a substantially cylindrical shape having a plurality of links with a slot formed between each pair of adjacent links, a bottom orifice for each link, and at least one slit extending upward from the bottom orifice, wherein top portions of the links correspond to the central portions of the strips, bottom portions of the links correspond to the end portions of the strips, the bottom orifices correspond to the second cutouts, and a side of the substantially cylindrical shape corresponds to the ends of the slits.

25. The method of claim 24, wherein each of the spaced apart aligned strips comprises a third cutout along a second edge of the flat sheet, and wherein each of the spaced apart flat strips comprises another slit that begins at the third cutout, and wherein the bottom orifices further correspond to the third cutouts aligning with the second cutouts.

26. The method of any of claims 24-26, where the sheet is made from a shape memory material.

27. The method of any of claims 24-26, wherein the cutouts are laser cut.