

What is claimed is:

1. A medical device delivery assembly, comprising:

an annular stent having a first plurality of apices spaced circumferentially around a first end portion of the stent, a second plurality of apices spaced circumferentially around a second end portion of the stent, and an intermediate portion disposed between the first and the second end portions, wherein the stent is configured to radially expand and axially foreshorten from a first state to a second state and to radially compress and axially elongate from the second state to the first state;

an elongate shaft disposed radially within and extending axially through the stent and having a first manifold coupled to the shaft distal to the first end of the stent, wherein the first manifold has a first plurality of openings;

a second manifold located proximal to the first manifold of the shaft, wherein the second manifold has a second plurality of openings;

a first plurality of sutures extending through at least some of the second openings of the second manifold, through the first openings of the first manifold, and through or around the first plurality of apices of the stent, wherein the first plurality of sutures is releasably coupled to the stent and configured such that increasing tension of the first plurality of sutures causes the first plurality of apices of the stent to radially converge; and

a second plurality of sutures extending through at least some second openings of the second manifold and through or around the second plurality of apices of the stent, wherein the second plurality of sutures is releasably coupled to the stent and configured such that increasing tension of the second plurality of sutures causes the second plurality of apices of the stent to radially converge,

wherein the intermediate portion of the stent can radially expand and axially foreshorten when the first and the second pluralities of apices radially converge.

2. The delivery assembly of claim 1 further comprising, a sheath which can be advanced distally over the stent to retain the stent in the first state and retracted proximally relative to the stent to permit radial expansion of the stent from the first state

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to the second state, wherein after the entirety of the stent is deployed from the sheath, the first and the second plurality of apices of the stent can be radially converged, and the sheath can be advanced distally back over the stent to cause the stent to radially collapse to the first state as it is recaptured by the sheath.

3. The delivery assembly of claim 1 or claim 2, wherein the first and the second plurality of sutures are configured to be independently movable relative to each other.

4. The delivery assembly of any previous claim, wherein the second plurality of openings of the second manifold is an inner set of openings and an outer set of openings, the inner set of openings being spaced radially inward from the outer set of openings, and wherein the first plurality of sutures extend through the inner set of openings of the second manifold, and the second plurality of sutures extend through the outer set of openings of the second manifold.

5. The delivery assembly of any previous claim, wherein the shaft is a first shaft, and the delivery assembly further comprises a second shaft to which the second manifold is coupled.

6. The delivery assembly of claim 5, wherein the first shaft is a nose cone shaft which extends coaxially through the second shaft, and a nose cone is mounted on a distal end of the nose cone shaft.

7. The delivery assembly of any previous claim, wherein the first manifold and the second manifold are configured to be axially movable relative to each other.

8. The delivery assembly of claim 7, wherein the delivery assembly is configured such that increasing a spacing between the first manifold and the second

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manifold causes the intermediate portion of the stent to axially elongate and to radially compress.

9. The delivery assembly of claim 8, wherein the delivery assembly is configured such that decreasing the spacing between the first manifold and the second manifold causes the intermediate portion of the stent to axially foreshorten and to radially expand.

10. The delivery assembly of any previous claim, wherein the stent is configured to be self-expandable from the first state to the second state.

11. The delivery assembly of any previous claim, further comprising at least one apex guide mounted on a suture of the first plurality of sutures or the second plurality of sutures.

12. A delivery apparatus for a prosthetic implant comprising:
an elongate first shaft;
a first suture guide coupled to the first shaft;
an elongate second shaft; and
a second suture guide coupled to the second shaft,
wherein the first shaft extends coaxially through the second shaft and the second suture guide, and the first suture guide is disposed distal to the second suture guide, and
wherein the first suture guide and the second suture guide are configured to be axially movable relative to each other.

13. The delivery apparatus of claim 12, wherein the first shaft is a nose cone shaft.

14. The delivery apparatus of claim 12 or claim 13, further comprising a sheath, wherein the first and the second suture guides are disposed radially within the

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sheath when delivering the prosthetic implant to an implantation location, and the first and the second suture guides are exposed from the sheath when implanting the prosthetic implant at the implantation location.