

assemblies, apparatuses, and methods may include an anchoring system that comprises an anchor for securing a mitral valve splint (“MV Splint”) in the heart. A spade-shaped assembly (while the term “spade-shaped” is used, this is meant to encompass a variety of different shapes and sizes) may be configured to be deployed in a right ventricle of the heart and to stabilize a catheter during penetrating the septum. An outer curved needle may be configured to penetrate the septum. The outer curved needle may comprise a hollow tube having a multiplicity of slits (e.g., S-shaped slits) disposed along the length of the needle so as to accommodate sharp curving of the needle. The outer curved needle may be further configured to deploy an inner needle into the left ventricle. A trocar catheter may be configured for puncturing tissue within the heart without damaging other nearby tissue. An introducer system or introducer assembly for interventional cardiology procedures may comprise an atraumatic and/or blunt shape introducer to protect nearby tissue within the heart during advancing a guidewire through a moving tissue, such as a beating heart. A threaded introducer may be configured for advancing a guidewire and/or other instruments through a moving tissue, such as a beating heart, in a controlled manner that helps prevent damage to surrounding tissue.

[0010a] An aspect of the present invention provides a self-expandable anchor comprising a disc-shaped configuration and a straightened configuration, the straightened configuration suitable for position inside a catheter, a ring with a ring-shaped configuration and a straightened configuration, the ring biased towards the ring-shaped configuration, a cover peripherally supported by the ring in the disc-shaped configuration of the anchor, and a tension member disposed centrally in the disc-shaped configuration, the tension member comprising a cord operable to draw a central portion of the cover taut towards a center of the ring in the disc-shaped configuration. The ring comprises a shape memory material, nitinol, or a shape memory alloy.

[0011] In an exemplary embodiment, an anchoring system for medical treatment, including treatment of heart dilation and/or functional mitral valve regurgitation comprises an anchor that can be used for fixating a splint, e.g., a mitral valve splint within a human heart. The anchoring system may include one or more or all of the following: a spade-shaped assembly configured to be deployed in a right ventricle

of the heart and to stabilize a catheter during penetrating the septum between the right ventricle and the left ventricle; a curved needle configured to penetrate the septum, the curved needle comprising a hollow tube having a multiplicity of slits (e.g., S-shaped slits) disposed along the length of the curved needle, the curved needle may be configured to pass through a catheter or a portion of the spade-shaped assembly and may also be configured to deploy an inner needle from the curved needle into the left ventricle; a trocar catheter configured for puncturing tissue; an introducer system for interventional cardiology procedures; and a threaded introducer configured for temporarily anchoring in a moving tissue and allowing advancement of a guidewire and/or other instruments therethrough.

CLAIMS

What is claimed is:

1. A self-expandable anchor comprising:
 - a disc-shaped configuration and a straightened configuration, the straightened configuration suitable for position inside a catheter;
 - a ring with a ring-shaped configuration and a straightened configuration, the ring biased towards the ring-shaped configuration, wherein the ring comprises a shape memory material, nitinol, or a shape memory alloy;
 - a cover peripherally supported by the ring in the disc-shaped configuration of the anchor; and
 - a tension member disposed centrally in the disc-shaped configuration, the tension member comprising a cord operable to draw a central portion of the cover taut towards a center of the ring in the disc-shaped configuration.
2. The self-expandable anchor of claim 1, wherein a surface area in the disc-shaped configuration is from 2 cm² to 6 cm².
3. The self-expandable anchor of claim 1 or claim 2, wherein the self-expandable anchor in the disc-shaped configuration with an area of 4 cm² holds a tensile force of 17 Newton.
4. The self-expandable anchor of any of claims 1–3, wherein the ring includes a circularly configured wire having atraumatic ends that meet at a break in the disc-shaped configuration.
5. The self-expandable anchor of claim 4, wherein the atraumatic ends include spherical portions or ball at the ends of the wire.

6. The self-expandable anchor of any of claims 1–5, wherein the ring includes a wire with a rectangular cross-sectional shape.
7. The self-expandable anchor of any of claims 1–6, wherein the cover includes a strip of material having a first, straight edge, and a second edge comprising a series of tabs, the straight strip of material folded onto a mid-region thereof to form a passage along a length of the straight edge, the ring received in the passage, and each tab folded over to define a loop, each loop receiving the tension member.
8. The self-expanding anchor of claim 7, wherein the tension member is tied to itself in a slip knot, allowing the tension member to cinch the loops towards a center of the ring.
9. The self-expanding anchor of claim 7, wherein the cover assumes a cone-shaped configuration when the tabs are pulled perpendicular to a plane of the ring.
10. The self-expandable anchor of claim 7, wherein the strip of the cover further comprises an intermediate portion including triangular or wedge-shaped portions.
11. The self-expandable anchor of any of claims 1–6, wherein the cover includes a dual lumen cloth or a tube-shaped cloth.
12. The self-expandable anchor of any of claims 1–11, wherein the cover comprises a polymer material, polyethylene terephthalate (PET), or ultra-high-weight polyethylene (UHMWPE).
13. An anchoring system comprising the self-expanding anchor of any of claims 1–12 and a mitral valve splint.