

CLAIMS

1. A valve repair device for repairing a native valve of a patient, the valve repair device comprising:

a coaption portion;

a collar attached to the coaption portion;

a cap that can be moved away from the collar;

a plurality of paddle portions, each paddle portion including an extendable portion that is extendable from a narrow condition to a wide condition;

wherein a length of the extendable portions is in a direction extending from the collar toward the cap;

wherein a width of the extendable portions is in a direction that is orthogonal to the length and extends across the two extendable portions;

wherein the width of the extendable portions in the wide condition is wider than the width of the extendable portions in the narrow condition;

a plurality of paddle frames connected to the cap and the paddle portions;

wherein the paddle portions are moveable between an open position and a closed position by moving the cap with respect to the collar;

2. The valve repair device of claim 1, wherein the width of the extendable portion is inversely proportional to the length of the extendable portion.
3. The valve repair device of any one of claims 1-2, wherein the extendable portion is formed from a tube of braided material.
4. The valve repair device of any one of claims 1-3, wherein the extendable portion is formed integrally with the paddle portion.
5. The valve repair device of claim 1, wherein the paddle frames reduce in width as the extendable portions extend from the narrow condition to the wide condition.
6. The valve repair device of claim 1, wherein the paddle frames are hoop-shaped.

7. The valve repair device of any one of claims 1-6, wherein the coaption portion is configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.
8. A valve repair device for repairing a native valve of a patient, the valve repair device comprising:
 - a coaption portion;
 - a collar attached to the coaption portion;
 - a cap that is movable away from the collar;
 - a plurality of paddle portions that each comprise two extendable portions surrounding a paddle expansion space;wherein the two extendable portions are extendable from a narrow condition to a wide condition;
 - wherein a length of the extendable portions is in a direction extending from the collar toward the cap;
 - wherein a width of the extendable portions is in a direction that is orthogonal to the length and extends across the two extendable portions;
 - wherein the width of the extendable portions in the wide condition is wider than the width of the extendable portions in the narrow condition;
 - a plurality of paddle frames connected to the cap and the paddle portions;
 - wherein movement of the cap toward the collar causes the paddle portions to move to a closed position, and movement of the cap away from the collar causes the paddle portions to move to an open position.
9. The valve repair device of claim 8, wherein the width of the paddle expansion space is inversely proportional to the length of the extendable portions.
10. The valve repair device of any one of claims 8-9, wherein the extendable portions are formed from tubes of braided material.

11. The valve repair device of any one of claims 8-10, wherein the extendable portions are formed integrally with the paddle portion.
12. The valve repair device of any one of claims 8-11, wherein the paddle frames reduce in width as the extendable portions move from the narrow condition to the wide condition.
13. The valve repair device of claim 8, wherein the paddle frames are hoop-shaped.
14. The valve repair device of any one of claims 8-13, wherein the coaption portion is configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.
15. A system, comprising:
 - a delivery catheter;
 - a valve repair device coupled to the delivery catheter, wherein the valve repair device comprises:
 - a plurality of paddle portions, each paddle portion including an extendable portion that is extendable from a narrow condition to a wide condition;
 - wherein a length of the extendable portions is in a direction extending from a proximal end of the valve repair device to a distal end of the valve repair device;
 - wherein a width of the extendable portions is in a direction that is orthogonal to the length and extends across the extendable portions;
 - wherein the width of the extendable portions in the wide condition is wider than the width of the extendable portions in the narrow condition;
 - a plurality of paddle frames connected to the paddle portions;
 - wherein the paddle portions are moveable between an open position and a closed position;
16. The system of claim 15, wherein the width of the extendable portion is inversely proportional to the length of the extendable portion.
17. The system of any one of claims 15-16, wherein the extendable portion is formed from a tube of braided material.

18. The system of any one of claims 15-17, wherein the extendable portion is formed from a shape-memory alloy.
19. The system of any one of claims 15-18, wherein the extendable portion is formed integrally with the paddle portion.
20. The system of claim 15, wherein the paddle frames reduce in width as the extended portions move from the narrow condition to the wide condition.
21. The system of claim 15, wherein the paddle frames are hoop-shaped.
22. The system of any one of claims 15-21, further comprising a coaption portion that is configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.
23. A system, comprising:
 - a delivery catheter;
 - a valve repair device coupled to the delivery catheter, wherein the valve repair device comprises:
 - a plurality of paddle portions that each comprise two extendable portions surrounding a paddle expansion space;
 - wherein each extendable portion is transitionable between a narrow condition and a broad condition;
 - wherein a length of the extendable portions is in a direction extending from the collar toward the cap;
 - wherein a width of the extendable portions is in a direction that is orthogonal to the length and extends across the two extendable portions;
 - wherein the width of the extendable portions in the broad condition is wider than the width of the extendable portions in the narrow condition;
 - a plurality of paddle frames connected to the paddle portions;
 - wherein the paddle portions are moveable between an open position and a closed position and are configured to attach to the native valve of the patient.

24. The system of claim 23, further comprising
 - a shaft;
 - a coaption portion;
 - a collar that the shaft extends through, the collar being attached to the coaption portion;
 - a cap attached to the shaft such that the cap can be moved by the shaft away from the collar.
25. The system of claim 24, wherein movement of the cap toward the collar causes the paddle portions to move to the closed position, and movement of the cap away from the collar causes the paddle portions to move to the open position.
26. The system of any one of claims 24-25, wherein the paddle portions are hingeably connected to the cap at a plurality of outer hinge regions.
27. The system of any one of claims 23-26, wherein at least one clasp is attached to at least one of the plurality of paddle portions.
28. The system of any one of claims 23-26, wherein at least one clasp is attached to each of the plurality of paddle portions.
29. The system of any one of claims 23-28, wherein the width of the paddle expansion space is inversely proportional to the length of the extendable portions.
30. The system of any one of claims 23-29, wherein the extendable portions are formed from tubes of braided material.
31. The system of any one of claims 23-30, wherein the paddle frames reduce in width as the extendable portions transition from the broad condition to the narrow condition.
32. The system of claim 23, wherein the paddle frames are hoop-shaped.
33. The system of any one of claims 24-32, wherein the coaption portion is configured to close a gap in a native valve when attached to the native valve.
34. The system of any one of claims 23-33, wherein the delivery catheter is configured to facilitate delivery to a native valve and attachment of the plurality of paddles to the native valve.