

CLAIMS

What is claimed is:

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

first and second paddle portions, wherein the first and second paddle portions are moveable between an open position and a closed position and are configured to attach to the native valve of the patient;

a first clasp attached to the first paddle portion, wherein the first clasp is moveable between an open position and a closed position and is configured to attach to the native valve of the patient;

a second clasp attached to the second paddle portion, wherein the second clasp is moveable between an open position and a closed position and is configured to attach to the native valve of the patient;

a first flexible portion that attaches the first paddle portion to a central portion of the device; and

a second flexible portion that attaches the second paddle portion to the central portion;

~~wherein the first flexible portion enables the first clasp and the first paddle portion to be moved to an open position while the second paddle portion and the second clasp are maintained in the closed position, wherein the attachment between the first clasp and the first paddle portion causes a pulling force to be applied to the first paddle portion when a pulling force is applied to the first clasp to move the first clasp from the closed position to the open position;~~

~~wherein the first flexible portion is configured such that the pulling force applied to the first paddle portion as a result of the pulling force being applied to the first clasp causes the first flexible portion to flex and the first paddle portion to move from the closed position to the open position; and~~

~~wherein the first paddle portion is configured to be moved from the closed position to the open position as a result of the pulling force being applied to the first clasp while the second paddle portion is maintained in the closed position.~~

2. The valve repair device of claim 1, wherein the first clasp is ~~opened~~ moved from the closed position to the open position by pulling on a moveable portion of the first clasp.

~~3. The valve repair device of any of claims 1-2, wherein opening the clasp forces the attached paddle portion to open.~~

~~4.3.~~ The valve repair device of any of claims ~~1-3~~ 1-2, further comprising:
a shaft;
a collar that the shaft extends through, the collar being attached to the central portion;
and
a cap attached to the shaft such that the cap can be moved by the shaft away from the collar;
wherein movement of the cap toward the collar causes both the first paddle portion and the second paddle portion to move to the closed position, and movement of the cap away from the collar causes both the first paddle portion and the second paddle portion to move to the open position.

~~5.4.~~ The valve repair device of claim ~~43~~ 43, wherein the first clasp comprises a fixed portion attached to the first paddle portion, a moveable portion having a barbed portion, and a hinge portion hingeably connecting the fixed portion to the moveable portion.

~~6.5.~~ The valve repair device of claim ~~54~~ 54, further comprising an actuation line attached to the moveable portion of the first clasp.

~~7.6.~~ The valve repair device of claim ~~54~~ 54, wherein applying tension to the actuation line causes the clasp to open and the paddle portion to open.

~~8.7.~~ The valve repair device of claim ~~76~~ 76, wherein a distance between the cap and the collar remains constant while tension is applied to the actuation line.

~~9.8.~~ The valve repair device of any of claims ~~1-81~~ 1-7, wherein the central portion, the first paddle portion, the second paddle portion, the first flexible portion, and the second flexible portion are formed from a strip of material.

~~10.9.~~ The valve repair device of claim ~~98~~, wherein the strip of material comprises metal strands that are woven together.

~~11.10.~~ The valve repair device of claim ~~98~~, wherein the strip of material comprises an electrospun material.

~~12.11.~~ The valve repair device of claim ~~98~~, wherein the strip of material extends from a beginning in the central portion to an end in the central portion.

~~13.12.~~ The valve repair device of claim ~~98~~, wherein the strip of material is folded to form a plurality of layers.

~~14.13.~~ The valve repair device of claim ~~13.12~~, wherein the central portion comprises a coaption element formed from four layers of the strip of material.

~~15.14.~~ The valve repair device of claim ~~13.12~~, wherein the flexible portions are formed from a single layer of the strip of material.

~~16.15.~~ The valve repair device of any of claims ~~1-15.1-14~~, wherein the paddle portions are disposed over paddle frames.

~~17.16.~~ The valve repair device of claim ~~16.15~~, wherein the paddle frames comprise a hoop and the strip of material is folded around the hoop.

~~18.17.~~ The valve repair device of any of claims ~~1-17.1-16~~, further comprising a coaption element configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.

~~19.—A valve repair device for repairing a native valve of a patient, the valve repair device comprising:~~

~~a coaption portion;~~

~~a first paddle portion;~~

~~a second paddle portion, wherein the first paddle portion and the second paddle portion are simultaneously moveable between an open position and a closed position by movement of a single paddle actuator from an open position to a closed position;~~
~~a first clasp attached to the first paddle portion;~~
~~a first clasp actuator coupled to the first clasp that is moveable from a closed position where the first clasp is closed to an open position where the first clasp is open;~~
~~a second clasp attached to the second paddle portion; and~~
~~a second clasp actuator coupled to the second clasp that is moveable from a closed position where the second clasp is closed to an open position where the second clasp is open;~~
~~wherein when the single paddle actuator is in the closed position, movement of the first clasp actuator from the closed position to the open position moves the first clasp to the open position and the first paddle to the open position while the second clasp remains in the closed position and the second paddle remains in the closed position.~~

~~20. — The valve repair device of claim 19, wherein the first clasp actuator opens the first clasp by pulling on a moveable portion of the first clasp.~~

~~21. — The valve repair device of any of claims 19-20, wherein opening the first clasp forces the attached first paddle portion to open.~~

~~22. — The valve repair device of any of claims 19-20, further comprising one cap portion attached to the first paddle portion by a first outer flexible portion and to the second paddle portion by a second outer flexible portion.~~

~~23. — The valve repair device of claim 22, wherein the single paddle actuator comprises:~~

~~a collar attached to the coaption portion; and~~
~~a shaft extending through the collar and being attached to the cap portion such that the cap can be moved by the shaft away from the collar;~~

~~wherein movement of the cap toward the collar causes the first paddle portion and the second paddle portion to move to the closed position, and movement of the cap away from the collar causes the first paddle portion and the second paddle portion to move to the open position.~~

~~24. — The valve repair device of claim 23, wherein the first clasp comprises a fixed portion attached to the first paddle portion, a moveable portion having a barbed portion, and a hinge portion connecting the fixed portion to the moveable portion.~~

~~25. — The valve repair device of claim 24, wherein the first clasp actuator comprises an actuation line attached to the moveable portion of the first clasp.~~

~~26. — The valve repair device of claim 25, wherein applying tension to the actuation line causes the first clasp to open and the paddle portion to open when the single paddle actuator is in the closed position.~~

~~27. — The valve repair device of claim 26, wherein a distance between the cap and the collar remains constant while tension is applied to the actuation line.~~

~~28. The valve repair device of any of claims 19-27, wherein the coaption portion, the first paddle portions, and the second paddle portion are formed from the strip of material.~~

~~29. — The valve repair device of claim 28, wherein the strip of material comprises metal strands that are woven together.~~

~~30. — The valve repair device of claim 28, wherein the strip of material comprises an electrospun material.~~

~~31. — The valve repair device of claim 28, wherein the strip of material extends from a beginning of the coaption portion to an end of the coaption portion.~~

~~32. — The valve repair device of claim 28, wherein the strip of material is folded to form a plurality of layers.~~

~~33. — The valve repair device of claim 32, wherein the coaption portion comprises a coaption element formed from four layers of the strip of material.~~

~~34. — The valve repair device of claim 32, wherein the inner flexible portions are formed from a single layer of the strip of material.~~

~~35. — The valve repair device of any of claims 19-34, wherein the first paddle portion is disposed over a first paddle frame and the second paddle portion is disposed over a second paddle frame.~~

~~36. — The valve repair device of claim 35, wherein the first paddle frame and the second paddle frame each comprise a hoop and the strip of material is folded around the hoops.~~

~~37. — The valve repair device of any of claims 19-36, wherein the coaption portion comprises a coaption element configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.~~