

CLAIMS

1. ~~1. A valve repair device for repairing a native valve of a patient, the valve repair device comprising:
a spacer;
a pair of paddles coupled to the spacer, wherein the pair of paddles are movable between an open position and a closed position, wherein the pair of paddles are configured to attach the valve repair device to the native valve of the patient;
at least one leak control extension extending from the spacer, wherein the leak control extension is configured to block retrograde blood flow along sides of the spacer.~~
2. ~~2. The valve repair device of claim 1, further comprising a cap that is connected to the spacer.~~
3. ~~3. The valve repair device of claim 2, wherein the at least one leak control extension is connected to the cap that is connected to the spacer.~~
4. ~~4. The valve repair device of claim 2, wherein the at least one leak control extension is pivotally attached to the cap.~~
5. ~~5. The valve repair device of any one of claims 1-4, wherein the at least one leak control extension is connected directly to the spacer.~~
6. ~~6. The valve repair device of any one of claims 1-5, further comprising pair of clasps, wherein the pair of paddles and the pair of clasps are configured to attach the valve repair device to the native valve of the patient.~~
7. ~~7. The valve repair device of any one of claims 1-6 wherein the spacer 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. — The valve repair device of any one of claims 1-7, wherein the at least one leak control extension comprises a deflector paddle having a flexible wire frame covered by a cloth barrier material.~~

~~9. — The valve repair device of claim 8, wherein the deflector paddle is connected to the spacer by one or more arms.~~

~~10. — The valve repair device of claim 8, wherein the flexible wire frame is configured to deform when positioned against a wall within the heart of the patient.~~

~~11. — The valve repair device of any one of claims 1-7, wherein the at least one leak control extension comprises a pocket that includes a flexible wire frame that defines an opening of the pocket and a cloth barrier material that defines at least a portion of the interior of the pocket.~~

~~12. — The valve repair device of claim 11, wherein the opening of the at least one leak control extension is configured to be positioned below one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~13. — The valve repair device of claim 11, wherein the opening of the at least one leak control extension is configured to be positioned above a ventricular end of the one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~14. — The valve repair device of any one of claims 1-7 and 11-12, wherein at least a portion of the leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~15. — The valve repair device of any one of claims 1-7 and 11 and 13, wherein the entire leak control extension is configured to be positioned above a ventricular end~~

~~of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~16. — The valve repair device of any one of claims 1-7 and 11-12, wherein the entire leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~17. — The valve repair device of any one of claims 1-7, wherein the at least one leak control extension comprises one or more deflector paddles and a barrier element.~~

~~18. — The valve repair device of claim 17, wherein each of the one or more deflector paddles has a flexible wire frame covered by a cloth barrier material.~~

~~19. — The valve repair device of any one of claims 17-18, wherein the barrier element comprises at least one of a cloth material, a biocompatible material, bovine or porcine heart tissue, and a plastic membrane.~~

~~20. — A valve repair device for repairing a native valve, the valve repair device comprising:~~

~~—— at least one anchor configured to attach the valve repair device to the native valve of the patient; and~~

~~at least one leak control extension extending from a portion of the device, wherein the leak control extension is configured to block retrograde blood flow adjacent or near the device.~~

~~21. — The valve repair device of claim 20, further comprising a coaption element.~~

~~22. — The valve repair device of claim 21, wherein the at least one leak control extension extends from the coaption element and is configured to block retrograde blood flow along sides of the coaption element.~~

~~23. — The valve repair device of any one of claims 21-22, further comprising a cap that is connected to the coaption element.~~

~~24. — The valve repair device of any one of claims 21-23, wherein the at least one leak control extension is connected directly to the coaption element.~~

~~25. — The valve repair device of any one of claims 23-24, wherein the at least one leak control extension is connected to the cap that is connected to the coaption element.~~

~~26. — The valve repair device of any one of claims 23-25, wherein the at least one leak control extension is pivotally attached to the cap.~~

~~27. — The valve repair device of any one of claims 21-26, wherein the at least one anchor comprises a pair of paddles coupled to the coaption element.~~

~~28. — The valve repair device of any one of claims 21-27, wherein the coaption element is configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.~~

~~29. — The valve repair device of any one of claims 20-28, further comprising at least one clasp, wherein the at least one anchor and the at least one clasp are configured to attach the valve repair device to the native valve of the patient.~~

~~30. — The valve repair device of claim 29, wherein the at least one clasp is coupled to a cap of the device.~~

~~31. — The valve repair device of any one of claims 20-30, wherein the at least one leak control extension comprises a deflector paddle having a flexible wire frame covered by a cloth barrier material.~~

~~32. — The valve repair device of claim 31, wherein the deflector paddle is connected to the coaption element by one or more arms.~~

~~33.— The valve repair device of claim 31, wherein the flexible wire frame is configured to deform when positioned against a wall within the native valve of the patient.~~

~~34.— The valve repair device of any one of claims 20-30, wherein the at least one leak control extension comprises a pocket that includes a flexible wire frame that defines an opening of the pocket and a cloth barrier material that defines at least a portion of the interior of the pocket.~~

~~35.— The valve repair device of claim 34, wherein the opening of the at least one leak control extension is configured to be positioned below one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~36.— The valve repair device of claim 34, wherein the opening of the at least one leak control extension is configured to be positioned above a ventricular end of the one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~37.— The valve repair device of any one of claims 20-30 and 34-35, wherein at least a portion of the leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~38.— The valve repair device of any one of claims 20-30 and 34 and 36, wherein the entire leak control extension is configured to be positioned above a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~39.— The valve repair device of any one of claims 20-30 and 34-35, wherein the entire leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~40. — The valve repair device of any one of claims 20-30, wherein the at least one leak control extension comprises one or more deflector paddles and a barrier element.~~

~~41. — The valve repair device of claim 40, wherein each of the one or more deflector paddles has a flexible wire frame covered by a cloth barrier material.~~

~~42. — The valve repair device of any one of claims 40-41, wherein the barrier element comprises at least one of a cloth material, a biocompatible material, bovine or porcine heart tissue, and a plastic membrane.~~

~~43. — A valve repair system for repairing a native valve of a patient, the valve repair system comprising:~~

~~—— a delivery sheath;~~

~~—— a valve repair device that is deployable to a native valve of the patient by the delivery sheath;~~

~~—— wherein the valve repair device comprises:~~

~~—— a spacer;~~

~~—— a pair of paddles coupled to the spacer, wherein the pair of paddles are movable between an open position and a closed position, wherein the pair of paddles are configured to attach the valve repair device to the native valve of the patient;~~

~~at least one leak control extension extending from the spacer,
wherein the leak control extension is configured to block retrograde blood flow along sides of the spacer.~~

~~44. — The system of claim 43, further comprising a cap that is connected to the spacer.~~

~~45. — The system of claim 44, wherein the at least one leak control extension is connected to the cap that is connected to the spacer.~~

~~46.—The system of claim 44, wherein the at least one leak control extension is pivotally attached to the cap.~~

~~47.—The system of any one of claims 43–46, wherein the at least one leak control extension is connected directly to the spacer.~~

~~48.—The system of any one of claims 43–47, further comprising pair of clasps, wherein the pair of paddles and the pair of clasps are configured to attach the valve repair device to the native valve of the patient.~~

~~49.—The system of any one of claims 43–48 wherein the spacer is configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.~~

~~50.—The system of any one of claims 43–49, wherein the at least one leak control extension comprises a deflector paddle having a flexible wire frame covered by a cloth barrier material.~~

~~51.—The system of claim 50, wherein the deflector paddle is connected to the spacer by one or more arms.~~

~~52.—The system of claim 50, wherein the flexible wire frame is configured to deform when positioned against a wall within the heart of the patient.~~

~~53.—The system of any one of claims 43–49, wherein the at least one leak control extension comprises a pocket that includes a flexible wire frame that defines an opening of the pocket and a cloth barrier material that defines at least a portion of the interior of the pocket.~~

~~54.—The system of claim 53, wherein the opening of the at least one leak control extension is configured to be positioned below one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~55.—The system of claim 53, wherein the opening of the at least one leak control extension is configured to be positioned above a ventricular end of the one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~56.—The system of any one of claims 43-49 and 53-54, wherein at least a portion of the leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~57.—The system of any one of claims 43-49 and 53 and 55, wherein the entire leak control extension is configured to be positioned above a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~58.—The system of any one of claims 43-49 and 53-54, wherein the entire leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~59.—The system of any one of claims 43-49, wherein the at least one leak control extension comprises one or more deflector paddles and a barrier element.~~

~~60.—The system of claim 59, wherein each of the one or more deflector paddles has a flexible wire frame covered by a cloth barrier material.~~

~~61.—The system of any one of claims 59-60, wherein the barrier element comprises at least one of a cloth material, a biocompatible material, bovine or porcine heart tissue, and a plastic membrane.~~

~~62.—A valve repair system for repairing a native valve of a patient, the valve repair system comprising:~~

~~——a delivery sheath;~~

~~—— a valve repair device that is deployable to a native valve of the patient by the delivery sheath;~~

~~—— wherein the valve repair device comprises:~~

~~at least one anchor configured to attach the valve repair device to the native valve of the patient;~~

~~at least one leak control extension extending from a portion of the device, wherein the leak control extension is configured to block retrograde blood flow adjacent or near the device.~~

~~63. — The system of claim 62 further comprising a coaption element.~~

~~64. — The system of claim 63, wherein the at least one leak control extension extends from the coaption element and is configured to block retrograde blood flow along sides of the coaption element.~~

~~65. — The system of any one of claims 63-64, further comprising a cap that is connected to the coaption element.~~

~~66. — The system of any one of claims 63-65, wherein the at least one leak control extension is connected directly to the coaption element.~~

~~67. — The system of any one of claims 65-66, wherein the at least one leak control extension is connected to the cap that is connected to the coaption element.~~

~~68. — The system of any one of claims 65-67, wherein the at least one leak control extension is pivotally attached to the cap.~~

~~69. — The system of any one of claims 63-68, wherein the at least one anchor comprises a pair of paddle coupled to the coaption element.~~

~~70. — The system of any one of claims 63-69, wherein the coaption element is configured to close a gap in the native valve of the patient when the valve repair device is attached to the native valve.~~

~~71. The system of any one of claims 62-70, further comprising at least one clasp, wherein the at least one anchor and the at least one clasp are configured to attach the valve repair device to the native valve of the patient.~~

~~72. The system of claim 71, wherein the at least one clasp is coupled to a cap of the device.~~

~~73. The system of any one of claims 62-72, wherein the at least one leak control extension comprises a deflector paddle having a flexible wire frame covered by a cloth barrier material.~~

~~74. The system of claim 73, wherein the deflector paddle is connected to the coaptation element by one or more arms.~~

~~75. The system of claim 73, wherein the flexible wire frame is configured to deform when positioned against a wall within the native valve of the patient.~~

~~76. The system of any one of claims 62-72, wherein the at least one leak control extension comprises a pocket that includes a flexible wire frame that defines an opening of the pocket and a cloth barrier material that defines at least a portion of the interior of the pocket.~~

~~77. The system of claim 76, wherein the opening of the at least one leak control extension is configured to be positioned below one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~78. The system of claim 76, wherein the opening of the at least one leak control extension is configured to be positioned above a ventricular end of the one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~79.—The system of any one of claims 62-72 and 76-77, wherein at least a portion of the leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~80.—The system of any one of claims 62-72 and 76 and 78, wherein the entire leak control extension is configured to be positioned above a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~81.—The system of any one of claims 62-72 and 76-77, wherein the entire leak control extension is configured to be positioned below a ventricular end of one or more leaflets of the native valve when the valve repair device is attached to the native valve.~~

~~82.—The system of any one of claims 62-72, wherein the at least one leak control extension comprises one or more deflector paddles and a barrier element.~~

~~83.—The system of claim 82, wherein each of the one or more deflector paddles has a flexible wire frame covered by a cloth barrier material.~~

~~84.—The system of any one of claims 82-83, wherein the barrier element comprises at least one of a cloth material, a biocompatible material, bovine or porcine heart tissue, and a plastic membrane.~~

~~85.—A method of repairing a native valve of a patient comprising:
——attaching a spacer between leaflets of the native valve of the patient;
——blocking retrograde blood flow through gaps between the spacer and the leaflets.~~

~~86.—The method claim 85 wherein the retrograde blood flow through the gaps is blocked without filling the gaps.~~

~~87.—The method claim 85 wherein the retrograde blood flow through the gaps is blocked without filling any portion of the gaps.~~

~~88.—The method of claim 85 wherein the retrograde blood flow is blocked by extensions that are at least partially disposed on a ventricular side of the leaflets.~~

~~89.—The method of claim 85 wherein the retrograde blood flow is blocked by extensions that are completely disposed on a ventricular side of the leaflets.~~

~~90.—The method of any one of claims 88 and 89 further comprising positioning the spacer to deform one or more of the extensions against a wall within the heart of the patient.~~

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

a first paddle;

a second paddle;

a pair of clasps disposed between the first paddle and the second paddle;

wherein the first paddle, the second paddle, and the pair of clasps are configured to attach the valve repair device to the native valve of the patient;

a barrier material extending from the first paddle to the second paddle.

2. The valve repair device of claim 1 wherein the barrier material is configured to prevent regurgitation of blood during the systolic phase.

3. The valve repair device of any one of claims 1-2 further comprising a spacer disposed between the first paddle and the second paddle.

4. The valve repair device of any one of claims 1-3 further comprising a pair of extension members attached to the barrier material.

5. The valve repair device of any one of claims 1-4 wherein the first paddle is attached to a cap, the second paddle is attached to the cap, and the barrier material is attached to the cap.

6. The valve repair device of any one of claims 1-5 wherein the barrier material comprises one or more pieces of a cloth material, a biocompatible material, bovine heart tissue, porcine heart tissue, or a plastic membrane.

7. The valve repair device of any one of claims 1-6 wherein the first paddle, the second paddle, and the pair of clasps are configured to attach the valve repair device to a native mitral valve.

8. A valve repair system for repairing a native valve of a patient, the valve repair system comprising:

a delivery sheath;

a valve repair device that is deployable to a native valve of the patient by the delivery sheath;

wherein the valve repair device comprises:

a first paddle;

a second paddle;

a pair of clasps disposed between the first paddle and the second paddle;

wherein the first paddle, the second paddle, and the pair of clasps are configured to attach the valve repair device to the native valve of the patient;

a barrier material extending from the first paddle to the second paddle.

9. The valve repair system of claim 8 wherein the barrier material is configured to prevent regurgitation of blood during the systolic phase.

10. The valve repair system of any one of claims 8-9 further comprising a spacer disposed between the first paddle and the second paddle.

11. The valve repair system of any one of claims 8-10 further comprising a pair of extension members attached to the barrier material.

12. The valve repair system of any one of claims 8-11 wherein the first paddle is attached to a cap, the second paddle is attached to the cap, and the barrier material is attached to the cap.

13. The valve repair system of any one of claims 8-12 wherein the barrier material comprises one or more pieces of a cloth material, a biocompatible material, bovine heart tissue, porcine heart tissue, or a plastic membrane.

14. The valve repair system of any one of claims 8-13 wherein the first paddle, the second paddle, and the pair of clasps are configured to attach the valve repair device to the native mitral valve.