

IN THE CLAIMS:

1. An endovascularly implanted medical assembly for a heart and for providing chordal
5 support to a leaflet of a heart valve comprising:
a chord for providing chordal support to the leaflet and extending through the leaflet
and between the leaflet and an intracardiac wall;
an anchor assembly for securing said medical assembly to the intracardiac wall, said
anchor assembly having a proximal end facing the leaflet and a distal end configured to
10 cooperate with said intracardiac wall to secure said anchor assembly and said chord;
an anchor line extending from said anchor assembly proximal end;
an endovascularly introduced removeable leaflet grasper for introducing said chord
into the heart and through the leaflet; and
a line gathering member for encompassing said chord and said anchor line wherein
15 said chord extends through said leaflet and distally, in a direction toward said anchor
assembly, and said chord is secured to said anchor line by said line gathering member.
2. The endovascularly implanted medical assembly according to Claim 1 wherein said
line gathering member is a lock comprising a lock positioning rod which defines a lumen for
20 receipt of said chord and said anchor line.
3. The endovascularly implanted medical assembly according to Claim 2 wherein said
lock positioning rod is connected at a distal end to a conduit and said medical assembly
further comprises a detachable lock within said rod lumen and said conduit and said
25 detachable lock are configured for receipt of said chord and wherein said lock is moveable
between an unlocked and locked position.
4. The endovascularly implanted medical assembly according to Claim 3 wherein said
lock comprises a first hypotube and a second hypotube wherein said first hypotube is
30 positioned within said conduit and said second hypotube is positioned within said first
hypotube and said lock is reversible.
5. The endovascularly implanted medical assembly according to Claim 4 wherein said
conduit defines an inner surface configured to matingly engage an outer surface of said
35 second hypotube to engage and disengage said lock.

6. The endovascularly implanted medical assembly according to Claim 5 wherein said first and second hypotubes are removeable from said conduit upon locking of said lock.
7. The endovascularly implanted medical assembly according to Claim 2 wherein said line gathering member is a lock having a chord lumen and an anchor lumen and said chord extends along said chord lumen and said anchor line extends along said anchor lumen and said lock further comprises a binding plate for binding said anchor line and chord.
8. The endovascularly implanted medical assembly according to Claim 7 further comprising an unlocking element for cooperating with said binding plate for unbinding said chord.
9. The endovascularly implanted medical assembly according to Claim 1 wherein said line gathering member is a chord tension regulator comprising an anchor lumen and a chord lumen wherein said anchor line extends within said anchor lumen and wherein said chord extends within said chord lumen and a control board wherein said chord is connected to a control board tension lever wherein movement of said tension lever adjusts tension of said chord positioned in the heart.
10. The endovascularly implanted medical assembly according to Claim 1 wherein said leaflet grasper has a proximal end and a distal end and comprises a control handle on its proximal end and a grasper arm adjacent its distal end and a grasper shaft extending between said proximal and distal ends wherein said grasper arm is configured to grasp the leaflet between said grasper arm and said grasper shaft.
11. The endovascularly implanted medical assembly according to Claim 10 wherein said anchor line extends within said grasper shaft.
12. The endovascularly implanted medical assembly according to Claim 10 wherein said leaflet grasper is formed of a flexible material.
13. The endovascularly implanted medical assembly according to Claim 10 wherein said grasper arm comprises a grasping plate connected to an articulating arm which is moveable from a first closed position for insertion of the said leaflet grasper to a second grasping position for securing the leaflet against said grasper shaft.

14. The endovascularly implanted medical assembly according to Claim 13 wherein said leaflet grasper further comprises a trajectory knob operatively connected to said distal end of said leaflet grasper for controlling trajectory of said leaflet grasper.

5 15. The endovascularly implanted medical assembly according to Claim 14 where said leaflet grasper further comprises a grasper control for moving said articulating arm and said grasping plate between said first and said second positions.

16. The endovascularly implanted medical assembly according to Claim 10 wherein said
10 leaflet grasper distal end defines a nosecone.

17. The endovascularly implanted medical assembly according to Claim 10 wherein said leaflet grasper comprises a puncturing rod extending within said grasper shaft and a puncturing rod distal end defining a puncturing element configured to puncture the leaflet
15 when the leaflet is retained in said grasping plate second grasping position.

18. The endovascularly implanted medical assembly according to Claim 17 wherein said anchor line is connected to said puncturing element and said anchor line extends within said puncturing rod.
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19. The endovascularly implanted medical assembly according to Claim 17 wherein said leaflet grasper comprises a receiving cap defining a lumen wherein said receiving cap is positioned in said grasper shaft distally to said puncturing element prior to puncturing the leaflet and said lumen is configured to receive said puncturing element when the leaflet has
25 been punctured.

20. The endovascularly implanted medical assembly according to Claim 19 wherein said leaflet grasper comprises a retracting rod extending within a chord release tube of said grasper shaft and wherein said receiving cap is connected to a distal end of said retracting rod and
30 said receiving cap is retracted from said leaflet grasper by retraction of said retracting rod.

21. The endovascularly implanted medical assembly according to Claim 1 wherein said cord includes a pledget on a proximal end and said pledget cooperates with a proximal side of the leaflet when said puncturing element has punctured the leaflet.
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22. The endovascularly implanted medical assembly according to Claim 1 wherein said cord includes a knot on a proximal end and said knot cooperates with a proximal side of the leaflet when said puncturing element has punctured the leaflet.
- 5 23. The endovascularly implanted medical assembly according to Claim 1 further comprising a transseptal sheath configured to receive said leaflet grasper to introduce said leaflet grasper into the heart.
24. The endovascularly implanted medical assembly according to Claim 1 further
10 comprising a crimper for grabbing said chord and said anchor line wherein said crimper includes a grasping hook configured to receive said chord and said anchor line.
25. The endovascularly implanted medical assembly according to Claim 24 wherein said
15 grasping hook is moveable between an open and closed position.
26. The endovascularly implanted medical assembly according to Claim 1 wherein said anchor assembly comprises an anchor having and anchor securing member on its distal end and an anchor cap on its proximal end.
- 20 27. The endovascularly implanted medical assembly according to Claim 26 wherein said anchor assembly further comprises an anchor line swivel having a docking ring rotatably connected to said anchor cap wherein said anchor line swivel rotates about said anchor cap and said chord extends proximal to said docking ring.
- 25 28. The endovascularly implanted medical assembly according to Claim 27 wherein said anchor assembly further comprises an anchor line rod extending proximally from said anchor line swivel and said chord extends proximally from said anchor line rod.
29. The endovascularly implanted medical assembly according to Claim 26 further
30 comprising an endovascularly inserted anchor delivery system comprising a delivery cable having a distal end configured to cooperate with said anchor cap wherein said anchor line swivel is configured to be received over said delivery cable.
30. The endovascularly implanted medical assembly according to Claim 29 wherein said
35 delivery cable is flexible.

31. The endovascularly implanted medical assembly according to Claim 29 wherein said delivery cable distal end is threaded and a proximal surface of said anchor cap defines a threaded receptable configured for removeable mating with said delivery cable distal end.
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32. The endovascularly implanted medical assembly according to Claim 28 wherein said anchor line swivel comprises at least two of said anchor line rods.
33. The endovascularly implanted medical assembly according to Claim 27 wherein said anchor cap comprises at least one locking arm sized and configured for releasably securing said anchor line swivel and cooperating with said docking ring.
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34. The endovascularly implanted medical assembly according to Claim 33 wherein said at least one locking arm extends in a first extended position a first distance from an outer surface of said anchor cap and moves to a second retracted position a second distance from said anchor cap outer surface wherein said second distance is less than said first distance.
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35. The endovascularly implanted medical assembly according to Claim 34 wherein said at least one locking arm which is biased in said first position.
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36. The endovascularly implanted medical assembly according to Claim 34 wherein said anchor line swivel is configured to move said at least one locking arm from said first extended position to said second retracted position and wherein said at least one locking arm secures said anchor line swivel on said anchor cap in said first extended position.
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37. The endovascularly implanted medical assembly according to Claim 34 wherein said anchor cap comprises at least two of said at least one locking arms.
38. The endovascularly implanted medical assembly according to Claim 28 wherein said anchor line rod defines a hook on its distal end and said docking ring defines an eyelet wherein said hook mates with said eyelet and said anchor line rod is connected to said eyelet and is rotatably moveable along said eyelet.
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39. The endovascularly implanted medical assembly according to Claim 28 wherein said anchor line rod has a proximal end which is coupled to said anchor line.
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40. The endovascularly implanted medical assembly according to Claim 39 wherein said anchor line rod defines a side channel and said anchor line extends through said channel and said anchor line extends proximally from said anchor line rod as a pair of said anchor lines.

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41. The endovascularly implanted medical assembly according to Claim 1 wherein said anchor assembly distal end comprises an anchor screw for implanting into the intracardiac wall.

10 42. A method of endovascularly implanting a medical assembly into a heart for providing chordal support to a leaflet of a heart valve comprising the steps of:

endovascularly inserting an anchor assembly and anchoring the anchor assembly to an intracardiac wall wherein the anchor assembly includes an anchor
15 having an anchor securing member on a distal end and an anchor cap on its proximal end;

endovascularly inserting an anchor line swivel and locking said anchor line swivel to said anchor cap wherein said anchor line swivel includes at least one anchor line extending proximally therefrom;

20 endovascularly inserting a leaflet grasper having a distal tip and a grasping arm adjacent its distal tip wherein the leaflet grasper distal end and grasping arm are inserted past and below the leaflet;

opening said grasping arm and closing the grasping arm to grasp the leaflet;

25 piercing the leaflet with said leaflet grasper by providing the leaflet grasper with a puncturing rod extending within said grasper leaflet and urging said puncturing rod distally to urge a puncturing element through the leaflet and beyond the leaflet in a direction towards the anchor assembly;

removing said leaflet grasper;

30 inserting a line gathering member and encompassing said chord and said anchor line and said chord is secured to said anchor line by said line gathering member; and adjusting the tension of the chord.

43. The method according to Claim 42 further comprising the step of removing said piercing element by providing the leaflet grasper with a receiving cap defining a

lumen and said receiving cap is positioned distally to said puncturing element prior to puncturing the leaflet and said step of piercing the leaflet includes capturing the piercing element within the lumen and withdrawing the receiving cap from the leaflet grasper.

- 5 44. The method according to Claim 42 further comprising the step of locking the tension of said chord after said step of adjusting the tension.