attached to the valve assembly and the wrapping or folding may then be removed from the skirt material.

[0021] In a second aspect, the method of fabricating an articulated support structure comprises interlinking a plurality of strut members into a flattened chain having a first end and a second end, wherein each of the plurality of strut members comprises a plurality of orifices, comprising placing a plurality of alignment guides through at least one orifice of each of the plurality of strut members, wherein each of the plurality of alignment guides is placed through the orifices of at least two strut members, securing the at least two strut members together, removing the plurality of alignment guides from the orifice, and connecting the first end of the flattened chain to the second end of the flattened chain to form a tubular structure. In some of these variations, the method further comprises securing a valve comprising a plurality of valve leaflets to the support structure, wherein securing the valve to the support structure comprises sandwiching the valve leaflets between the strut members. In some of these variations, the plurality of strut members comprises a plurality of coaptation strut members. In some of these variations, the method further comprises further comprising rotating the coaptation struts from a first position to a second position to bias the valve toward a closed configuration. In some variations, the method further comprises securing a skirt to the support structure, wherein securing the skirt to the support structure comprises sandwiching the skirt between the strut members. In some of these variations, the method further comprises interlinking a second plurality of strut members into a second flattened chain having a first end and a second end, wherein each of the second plurality of strut members comprises a plurality of orifices, comprising placing a second plurality of alignment guides through at least one orifice of each of the second plurality of strut members, wherein each of the second plurality of alignment guides is placed through the orifices of at least two strut members of the second plurality of strut members, securing the at least two strut members of the second plurality of strut members together, removing the second plurality of alignment guides from the orifice, and connecting the first end of the second flattened chain to the second end of the second flattened chain to form a second tubular structure, and securing a skirt to the second tubular structure, wherein securing the skirt to the second tubular structure comprises sandwiching the skirt between the strut members.

[0022] Disclosed herein is an articulated support structure configured to be placed in a lumen comprising a plurality of strut

members connected by a plurality of articulated joints into a tubular shape, a plurality of valve leaflets forming a valve, wherein each of the plurality of valve leaflets is sandwiched between at least two of the plurality of strut members, and a skirt configured to help seal the valve in the lumen, wherein the skirt is sandwiched between at least two of the plurality of strut members. In some of these variations, the articulated support structure is reversibly and incrementally adjustable between an expanded configuration and a compressed configuration. In some of these variations, the articulated support structure further comprises an actuator, wherein the actuator is configured to reversibly and incrementally adjust the articulated support structure between an expanded configuration and a compressed configuration. In some variations, the articulated support structure does not comprise any sutures. In some variations, the articulated support structure further comprises a plurality of coaptation struts, wherein the coaptation struts are configured to bias the valve toward a closed configuration.

[0023] Disclosed herein is an assembly system for an articulated structure, comprising a backing support, the backing support comprising a plurality of backing support strut alignment openings, and a cover plate, the cover support comprising and a plurality of cover support strut alignment openings, wherein the plurality of backing support strut alignment openings are aligned with the plurality of cover support strut alignment openings. The backing support may further comprise indicia along the plurality of backing support strut alignment openings indicating strut positions. The backing support may further comprise at least one swaging alignment structure.

[0024] The assembly system may further comprise a plurality of alignment pins configured to reside in the plurality of backing support strut alignment openings and the plurality of cover support strut alignment openings. The assembly system may further comprise a plurality of struts and a plurality of eyelets. The assembly may further comprise a plurality of valve leaflets. The assembly system may further comprise at least one sealing material. Each of the plurality of sealing material sheets may comprise at least one attaching tab. The assembly system of claim 31, wherein the plurality of struts comprises a plurality of primary struts and a plurality of commissure struts. The backing support may further comprise at least one cover support retaining structure. The at least one cover support retaining structure may comprise a clip. At least one of the backing support and the cover support may comprise a support alignment structure configured to facilitate alignment of the backing support and the cover support. The backing support may be a backing plate, and the cover support may be a

cover plate. The backing support may further comprise at least one jig alignment structure. The assembly system may further comprise a shim or protective insert. The protective insert may comprise a plurality of alignment openings, and/or may comprise base regions and commissure regions. The base regions may each comprise a triangular shape, and the commissure regions may comprise an elongate shape.

[0025] Disclosed herein is a medical device is provided, comprising a first plurality of separate struts in a first tubular scissor linkage configuration, wherein at least one strut of the first plurality of separate struts comprises an integrally formed U-shape or V-shape strut. Two or three struts of the first plurality of separate struts may comprise once-piece or integrally formed U-shape or V-shape struts. The first plurality of separate struts may further comprise a plurality of inner struts and a plurality of outer struts configured in the scissor linkage configuration. The integrally formed U-shape or V-shape strut may be attached to one of the first plurality of inner struts and one of the first plurality of outer struts. The U-shape or V-shape strut may comprise an apical opening. The U-shape or V-shape strut may comprise an apical extension the apical opening is located on the apical extension. The medical device may further comprise a sealing structure, the sealing structure comprising at least one base region and at least one extension region, wherein the at least one extension region is coupled to the at least one strut of the first plurality of separate struts comprising the integrally formed U-shape or V-shape strut. The extension region may comprise at least one tab configured to wrap around the at least one strut of the first plurality of separate struts comprising the integrally formed U-shape or V-shape strut. The at least one tab may be sutured to the at least one strut of the first plurality of separate struts comprising the integrally formed U-shape or V-shape strut. The at least one base region comprises may be compressed between two struts of the first plurality of separate struts. The medical device may further comprise a second plurality of separate struts in a second tubular scissor linkage configuration, wherein the first plurality of separate struts is located in a lumen of the second tubular scissor linkage configuration of the secondary plurality of separate struts. The medical device may further comprise at least one valve leaflet attached to at least one strut of the first plurality of separate struts comprises an integrally formed U-shape or V-shape strut.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The foregoing and other objects, features and advantages of the invention will be apparent from the following more particular description of particular embodiments of the

Claims

1. A method of fabricating an articulated support structure, comprising:

placing a plurality of pins through openings in an alignment plate;

placing a plurality of eyelets onto the plurality of pins;

layering a plurality of strut members each having a plurality of orifices onto the plurality of pins by placing the pins through the orifices;

connecting the plurality of strut members into a chain having a first end and a second end by swaging the eyelets; and

wrapping the chain into a tubular structure by connecting the first and second ends of the chain.

2. The method of claim 1, further comprising placing a plurality of valve leaflets onto the plurality of pins; wherein at least one of the plurality of strut members is layered below each valve leaflet, and at least one of the plurality of strut members is layered above each valve leaflet.

3. The method of claim 2, further comprising biasing the valve leaflets into a closed configuration after wrapping the chain into a tubular structure, by rotating at least one of the plurality of strut members from a first position to a second position.

4. The method of claim 2, further comprising placing a skirt material onto the plurality of pins, wherein at least one of the plurality of strut members is layered below the skirt material, and at least one of the plurality of strut members is layered above the skirt material.

5. The method of claim 4, further comprising attaching an actuator to the articulated support structure, wherein the actuator is configured to reversibly and incrementally adjust the articulated support structure between an expanded configuration and a compressed configuration.

6. The method of claim 2, further comprising attaching the articulated support structure to a second articulated support structure.

7. The method of claim 6, further comprising attaching an actuator to the second articulated support structure, wherein the actuator is configured to reversibly and incrementally adjust the articulated support structure and the second articulated support structure between an expanded configuration and a compressed configuration.

8. The method of claim 1, further comprising placing a skirt material onto the plurality of pins, wherein at least one of the plurality of strut members is layered below the skirt material, and at least one of the plurality of strut members is layered above the skirt material.

9. The method of claim 8, further comprising attaching the articulated support structure to a second articulated support structure.

10. The method of claim 9, further comprising attaching an actuator to the articulated support structure, wherein the actuator is configured to reversibly and incrementally adjust the articulated support structure and the second articulated support structure between an expanded configuration and a compressed configuration.

11. The method of claim 1, further comprising place a skirt material onto the plurality of pins before any of the strut members are placed.

12. The method of claim 11, further comprising tucking the skirt material in between at least two of the plurality of strut members.

13. The method of claim 12, wherein the tucking is performed without using suture.

14. The method of claim 11, wherein tucking is performed by pivoting a folding pin against one strut of the plurality of strut members to wrap the skirt material over the one strut.

15. The method of claim 14, further comprising inserting the pin under the one strut after wrapping the skirt material over the one strut.

16. The method of claim 15, further comprising holding the skirt material against the one strut by piercing the skirt material at two different locations with the folding pin.

17. A method of fabricating an articulated support structure, comprising:

interlinking a plurality of strut members into a flattened chain having a first end and a second end, wherein each of the plurality of strut members comprises a plurality of orifices, comprising:

placing a plurality of alignment guides through at least one orifice of each of the plurality of strut members, wherein each of the plurality of alignment guides is placed through the orifices of at least two strut members;

securing the at least two strut members together;

removing the plurality of alignment guides from the orifice; and

connecting the first end of the flattened chain to the second end of the flattened chain to form a tubular structure.

18. The method of claim 17, further comprising securing a valve comprising a plurality of valve leaflets to the support structure, wherein securing the valve to the support structure comprises sandwiching the valve leaflets between the strut members.

19. The method of claim 18, further comprising:

interlinking a second plurality of strut members into a second flattened chain having a first end and a second end, wherein each of the second plurality of strut members comprises a plurality of orifices, comprising:

placing a second plurality of alignment guides through at least one orifice of each of the second plurality of strut members, wherein each of the second plurality of alignment guides is placed through the orifices of at least two strut members of the second plurality of strut members;

securing the at least two strut members of the second plurality of strut members together;

removing the second plurality of alignment guides from the orifice; and

connecting the first end of the second flattened chain to the second end of the second flattened chain to form a second tubular structure; and

securing a skirt to the second tubular structure, wherein securing the skirt to the second tubular structure comprises sandwiching the skirt between the strut members.

20. The method of claim 17, wherein the plurality of strut members comprises a plurality of coaptation strut members, further comprising:

rotating the coaptation struts from a first position to a second position to bias the valve toward a closed configuration.

21. The method of claim 17, further comprising securing a skirt to the support structure, wherein securing the skirt to the support structure comprises sandwiching the skirt between the strut members.