

slack in the loop permits the structural band to expand but prevents over-expansion of the stent past the second diameter. The loop preferably comprises a single suture threaded at least three times through the holes and tied off on the outside of the band. The slack in the loop may be located outside the band, and the loop and slack are hidden when the support stent is covered in cloth. Desirably, the overlapping free ends are located at a single one of the inflow cusps of the support stent.

[0012] In a third alternative embodiment, the valve member has an exterior fabric covering and an expansion limiting flexible loop extending around the periphery of the valve member, the flexible loop having high tensile strength sewn to the fabric covering that permits the support stent to expand from the first diameter to the second diameter and prevents over-expansion of the stent past the second diameter. The flexible loop is desirably made of high tensile strength fiber. The flexible loop may be sewn to an outer edge of a suture-permeable sewing ring of the valve that surrounds the inflow cusps of the support stent, the sewing ring being compressible so as to permit the support stent to expand from the first diameter to the second diameter until the flexible loop becomes taut and limits further expansion. The flexible loop may be attached around the sewing ring with intermittent stitches or sewn in and out of the sewing ring with two free ends tied together. Alternatively, the flexible loop is sewn to a portion of the fabric covering directly around the support stent and incorporates a section of slack that permits the support stent to expand from the first diameter to the second diameter until the flexible loop becomes taut and limits further expansion. The structural band may have overlapping free ends such that relative sliding of the overlapping free ends permits expansion of the support stent. The overlapping free ends are desirably located at a single one of the inflow cusps of the support stent.

[0013] In any of the surgical heart valves having a structural band with overlapping free ends, a flexible sleeve may further surround the free ends and hold them radially together. In one embodiment, the sleeve is made of a material selected from the group consisting of polyester shrink wrap tubing and silicone rubber. Also, the sleeve may be biodegradable to maintain alignment of the two free ends for a period after implant and then degrade to permit even easier expansion of the band.

WHAT IS CLAIMED IS:

1. A prosthetic surgical heart valve adapted for post-implant expansion and having an inflow end and an outflow end, comprising:
a valve member including a non-collapsible inner structural support stent having three upstanding commissure posts extending in an outflow direction and spaced evenly around a periphery of the support stent alternating with three arcuate inflow cusps midway between adjacent commissure posts, and three flexible leaflets attached along the commissure posts and inflow cusps of the support stent configured to ensure one-way blood flow through the valve member, the support stent periphery defining a non-collapsible delivery and implant circumference having a first diameter, wherein the support stent permits expansion of the periphery from the first diameter to a second diameter larger than the first diameter upon application of an outward dilatory force from within the support stent substantially larger than forces associated with normal physiological use, the support stent including a structural band extending around the periphery that permits expansion of the support stent, and the valve member having an exterior fabric covering and an expansion limiting flexible loop extending around the periphery of the valve member, the flexible loop having high tensile strength sewn to the fabric covering that permits the support stent to expand from the first diameter to the second diameter and prevents over-expansion of the stent past the second diameter.
2. The prosthetic heart valve of claim 1, wherein the flexible loop is made of high tensile strength fiber.
3. The prosthetic heart valve of any preceding claim, wherein the flexible loop is sewn to an outer edge of a suture-permeable sewing ring of the valve that surrounds the inflow cusps of the support stent, the sewing ring being compressible so as to permit the support stent to expand from the first diameter to the second diameter until the flexible loop becomes taut and limits further expansion.