# The 6F LifeStent NT Self-Expanding Helical Stent

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The 6F LifeStent NT is an implantable self-expanding nickel titanium alloy (Nitinol) stent. The stent is manufactured from small diameter Nitinol tubing and is loaded into a delivery catheter for placement/deployment into a vessel.

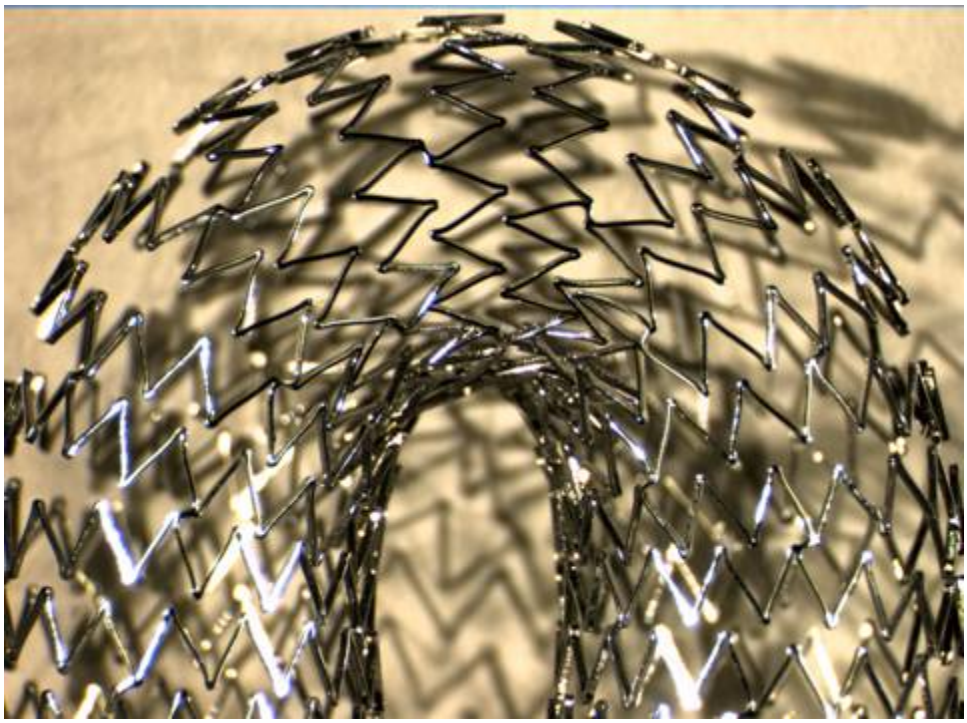
The stent is based on a helical design which offers a wide range of performance advantages when compared to stents with circumferential hoops. The helix pattern is inherently more flexible than circumferential hoop designs because a helix has an additional degree of flexibility (torsion) with respect to longitudinal bending. This additional degree of freedom imparts a high degree of kink resistance and enables the helical stent to maintain excellent wall apposition under the combined effects of bending, twisting and stretching.

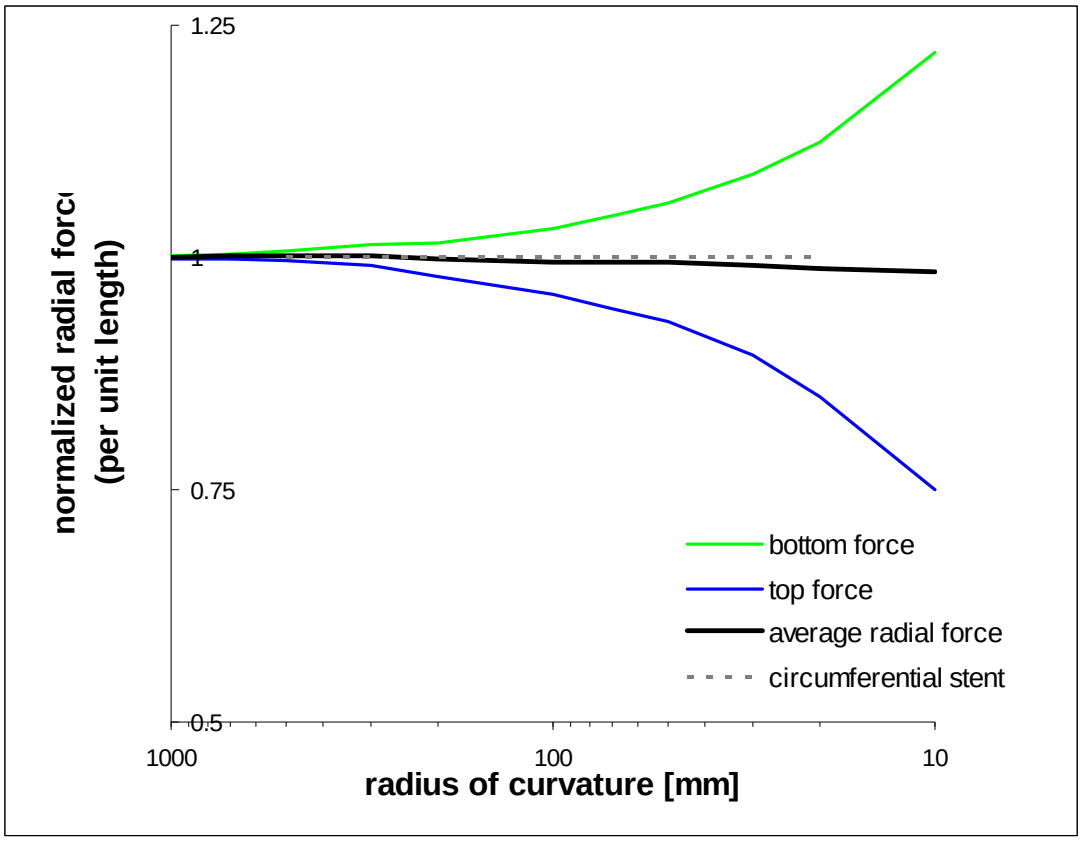
The LifeStent NT achieves this enhanced flexibility while maintaining the same radial force characteristics as similar 6F circumferential designs manufactured from Nitinol tubing. This is possible because radial stiffness and chronic outward forces depend primarily on the dimensions of the struts and the helical design dictates only the patterns of connections, or bridges, between the struts. The LifeStent NT therefore combines the flexibility benefits of a helical architecture and the radial force and tight mesh density of a Nitinol tubing stent.

A Figure shows a plot of the (normalized) radial force characteristics of the 6F LifeStent as a function of radius of curvature. While the radial force along the top and bottom of the stent are different, the average radial force per unit length of the stent remains constant over a wide range of deployment conditions. In comparison, a cylindrical stent of similar design has the same radial force characteristics, yet exhibits kinking at smaller radii of curvature.

The enhanced flexibility and kink resistance also translates into a device with potentially greater durability than a circumferential stent design. The number, location and pattern of the helical bridge connectors were carefully chosen to allow the device to respond to complex repeated loading more naturally and with lower material strains.

The excellent flexibility and radial force characteristics of the LifeStent NT make it a strong candidate for treating occlusive and/or stenotic disease in the presence of tortuous anatomy and/or complex, repeated loading. Another Figure shows the 6F LifeStent deployed across a flexion point of a very calcified popliteal lesion. The stent exhibits good visibility for a Nitinol stent and demonstrates the conformability of the device to native vasculature.




1.25
1
0.75
0.5
normalized radial force
(per unit length)
1000
100
10
radius of curvature [mm]
bottom force
top force
average radial force
circumferential stent