

CLAIMS

We claim:

1. A vascular access instrument configured to insert through a vascular access device, the vascular access instrument comprising:

a coil formed by a flat wire wound around an axis into a plurality of loops, wherein each of the plurality of loops of the coil is spaced apart from a next adjacent loop of the plurality of loops.
2. The vascular access instrument of claim 1, further comprising a core wire extending through at least a portion of the coil.
3. The vascular access instrument of claim 2, wherein the core wire is cylindrical.
4. The vascular access instrument of claim 2, wherein the core wire is flat.
5. The vascular access instrument of claim 2, wherein the core wire is aligned with the axis.
6. The vascular access instrument of claim 2, wherein the core wire is offset from the axis.
7. The vascular access instrument of claim 6, wherein the flat wire comprises a first side and a second side opposite the first side, wherein the first side forms an outer surface of the coil, wherein the second side forms an inner surface of the coil, wherein the core wire is coupled to the inner surface of the coil.
8. The vascular access instrument of claim 1, further comprising an elongated strip extending through the coil, wherein each of the plurality of loops comprises a distal end and a proximal end, wherein the distal end and the proximal end contact the elongated strip.
9. The vascular access instrument of claim 1, further comprising a plurality of support beams extending between the coil, wherein a first set of the plurality of support beams is

disposed along a first line parallel to the axis, wherein a second set of the plurality of support beams is disposed along a second line parallel to the axis, wherein the first line is spaced apart from the second line.

10. The vascular access instrument of claim 9, wherein the first line is 180 degrees apart from the second line.
11. The vascular access device of claim 9, wherein a third set of the plurality of support beams is disposed along a third line parallel to the axis, wherein the first line, the second line, and the third line are evenly spaced around a circumference of the coil.
12. The vascular access device of claim 11, wherein a complete turn of the coil is disposed in between next adjacent support beams of the first set, next adjacent support beams of the second set, and next adjacent support beams of the third set.
13. The vascular access device of claim 1, wherein the coil comprises another plurality of loops, wherein the other plurality of loops is proximate the plurality of loops, wherein each of the other plurality of loops of the coil contacts a next adjacent loop of the other plurality of loops along a circumference of the next adjacent loop of the other plurality of loops.
14. A vascular access system, comprising:
 - a catheter assembly, comprising a catheter adapter and a catheter extending distally from the catheter adapter;
 - an instrument advancement device coupled to the catheter assembly, wherein the instrument advancement device comprises a vascular access instrument, wherein the instrument advancement device is configured to advance the vascular access instrument from a retracted position to an advanced position beyond a distal end of the catheter,

wherein the vascular access instrument comprises a coil formed by a flat wire wound around an axis into a plurality of loops, wherein each of the plurality of loops of the coil is spaced apart from a next adjacent loop of the plurality of loops, wherein the distal end of the catheter comprises a distal opening, wherein the coil extends through the distal opening of the catheter in response to the vascular access instrument being in the advanced position.

15. The vascular access system of claim 14, wherein the distal end of the catheter comprises a plurality of diffuser holes.
16. The vascular access system of claim 14, further comprising a core wire extending through the plurality of coils, further comprising a gap in the core wire at the distal opening of the catheter.
17. The vascular access system of claim 14, further comprising a plurality of support beams extending between the coil, wherein a first set of the plurality of support beams is disposed along a first line parallel to the axis, wherein a second set of the plurality of support beams is disposed along a second line parallel to the axis, wherein the first line is spaced apart from the second line.
18. The vascular access system of claim 14, wherein a complete turn of the coil is disposed in between next adjacent support beams of the first set and next adjacent support beams of the second set.
19. A vascular access instrument configured to insert through a vascular access device, the vascular access instrument comprising:

a distal end, comprising a tubular element, wherein the tubular element comprises a plurality of holes;

a wire; and

a connector disposed between the tubular element and the wire, wherein the connector comprises another plurality of holes.

20. The vascular access instrument of claim 19, wherein a distal end of the tubular element is closed.