CLAIMS

1. A catheter system, comprising:

a catheter assembly, comprising:

a catheter adapter, comprising a distal end, a proximal end, an inner surface forming a lumen, the lumen extending through the distal end and the proximal end, and a side port disposed between the distal end and the proximal end;

an annular valve disposed within the lumen and aligned with the side port, wherein the annular valve seals a fluid pathway from the side port to the lumen;

a retainer ring disposed proximal and proximate the annular valve within the lumen; and

a catheter extending distally from the distal end of the catheter adapter.

2. The catheter system of claim 1, wherein the inner surface comprises an undercut, wherein the retainer ring is disposed within the undercut.
3. The catheter system of claim 1, wherein the annular valve comprises silicon.
4. The catheter system of claim 1, wherein the annular valve is cylindrical.
5. The catheter system of claim 1, wherein the retainer ring is formed by molding.
6. The catheter system of claim 1, wherein the retainer ring is plastic.
7. The catheter system of claim 1, further comprising a needle assembly, wherein the needle assembly comprises a needle hub and an introducer needle extending distally from the needle hub and through the retainer ring, the annular valve, and the catheter.
8. The catheter system of claim 1, wherein the side port extends from a top of the catheter adapter.
9. The catheter system of claim 1, wherein the side port is configured to receive a syringe.

10. The catheter system of claim 1, wherein the retainer ring is configured to reduce proximal movement of the annular valve in response to fluid infusion through the side port that opens the annular valve.

~~11. A method of flushing a catheter assembly, comprising:~~

~~coupling an infusion device to a side port of a catheter adapter of the catheter assembly, wherein the catheter assembly comprises:~~

~~a catheter adapter, comprising a distal end, a proximal end, an inner surface forming a lumen, the lumen extending through the distal end and the proximal end, and a side port disposed between the distal end and the proximal end;~~

~~an annular valve disposed within the lumen and aligned with the side port, wherein the annular valve seals a fluid pathway from the side port to the lumen;~~

~~a retainer ring disposed proximal and proximate the annular valve within the lumen; and~~

~~a catheter extending distally from the distal end of the catheter adapter;~~

~~activating the infusion device, wherein in response to activating the infusion device, the annular valve is opened to allow fluid to flow from the side port into the lumen, wherein in response to activating the infusion device, a proximal end of the annular valve is forced against the retainer ring and the retainer ring remains in place.~~

~~12. The method of claim 11, wherein the infusion device comprises a syringe, wherein activating the infusion device comprises depressing a plunger of the syringe.~~

~~13. The method of claim 11, the inner surface comprises an undercut, wherein the retainer ring is disposed within the undercut.~~

~~14. The method of claim 11, wherein the annular valve comprises silicon.~~

~~15. The method of claim 11, wherein the annular valve is cylindrical.~~

~~16. The method of claim 11, wherein the retainer ring is formed by molding.~~

~~17. The method of claim 11, wherein the retainer ring is plastic.~~

~~18. The method of claim 11, further comprising uncoupling and removing a needle assembly from the catheter adapter, wherein the needle assembly comprises a needle hub and an introducer needle extending distally from the needle hub and through the retainer ring, the annular valve, and the catheter, wherein the infusion device is activated after the needle assembly is uncoupled and removed from the catheter adapter.~~

~~19. The method of claim 11, wherein the side port extends from a top of the catheter adapter.~~

~~20. The method of claim 11, wherein the catheter is a peripheral intravenous catheter.~~