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## A New Flow Diverter Design with Retractable Delivery Wire Tip

*K. Gromann<sup>1</sup>, S. Rolla<sup>1</sup>, V. Trösken<sup>1</sup>, R. Hannes<sup>1</sup>, H. Monstadt<sup>1</sup>, H. Henkes<sup>2</sup>*

<sup>1</sup>phenox GmbH, Bochum, Germany

<sup>2</sup>Klinikum Stuttgart, Klinik für Neuroradiologie, Stuttgart, Germany

**Introduction:** The implantation of braided Flow Diverter (FD) became a standard intervention to treat intra-/extracranial aneurysms in recent years. The implant is usually loaded onto a delivery system with a core wire reaching out distally of the implant facilitating the microcatheter passage. Since all braided FD show a foreshortening effect, the delivery wire prolongs distally during the implant deployment. In case the migrated wire tip gets caught in a bifurcation or other challenging vessel anatomies, the FD expansion can be hindered or a vessel perforation can be caused by the wire tip. In this work we present our approach to design and validate a product with a "Movable Wire" that prevents the distal migration of the delivery wire and supports flow diverter deployment.

**Methods:** Based on our experience with the p64 Flow Modulation Device we have developed the p48 MW Flow Modulation Device. This new FD is loaded onto a novel delivery system with a movable core wire. Although the wire already has a highly flexible Nitinol tip to prevent perforation of distal blood vessels the user now can choose to retract the wire while keeping the FD in place during deployment. Furthermore, the aim was to confirm compatibility with a 0.021" microcatheter (MC). To assess the functionality of the new feature, the product was tested *in vitro* in a 3D silicone model in different challenging vessel anatomies. In addition, a porcine *in vivo* study was performed to assess the deployment of the new flow diverter with the novel delivery system.

**Results:** During the *in vitro* study it was possible to successfully deploy long p48 MW implants without distal migration of the delivery wire in different silicone vessel anatomies (bifurcations, straight and curved vessels) using a 0.021" MC. The implants expanded completely in all assessed cases. Finally, in the *in vivo* study all implants were deployed successfully at the target zone and expanded completely in the blood vessel. The functionality of the product during both studies (*in vitro* and *in vivo*) was confirmed.

**Conclusion:** The "Movable Wire" is a functional feature to support the deployment of foreshortening implants like braided FD. The performance of the new delivery system could be confirmed successfully *in vitro* and *in vivo* using a 0.021" MC. As a result, the novel design will be a key concept of the newly developed p48 MW Flow Modulation Device.