GUIDANCE DEVICE TO GUIDE INSTRUMENTS FOR ENDOVASCULAR APPLICATIONS

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Invention

The present invention concerns the development of **catheters designed for navigation and stabilization of endovascular instrumentation** close to a target to be reached with extreme precision.

The instrumentation is designed to overcome the limitations given by the difficulty of identifying the correct in-situ fenestration site of standard endoprostheses for repair of complex abdominal aneurysms. It provides as an added advantage that of mechanically stabilizing the devices during the fenestration procedure with an Xray-free approach. In fact, thanks to device sensorization, it is possible to develop a navigation platform capable of showing the surgeon, in real time, the position of the instrumentation within a 3D model of the patient's anatomy (without requiring multiple fluoroscopic image acquisition as in traditional endovascular procedures).

Drawings & pictures

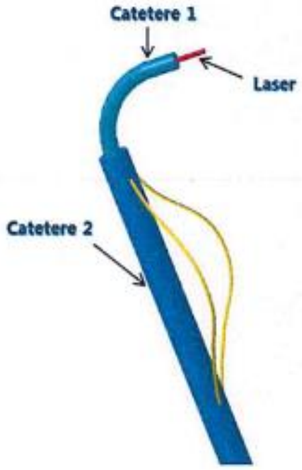
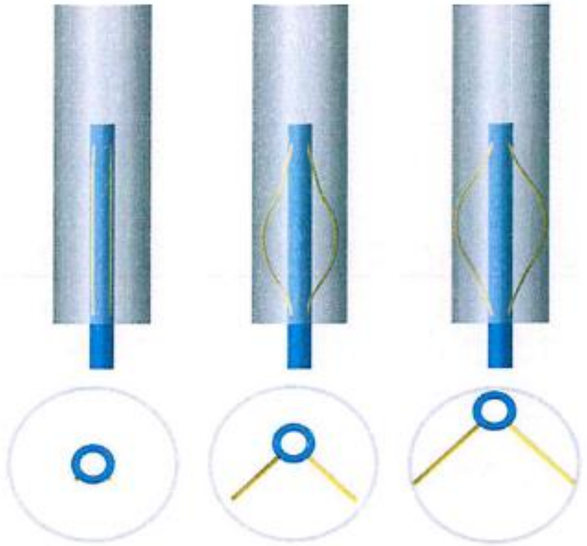
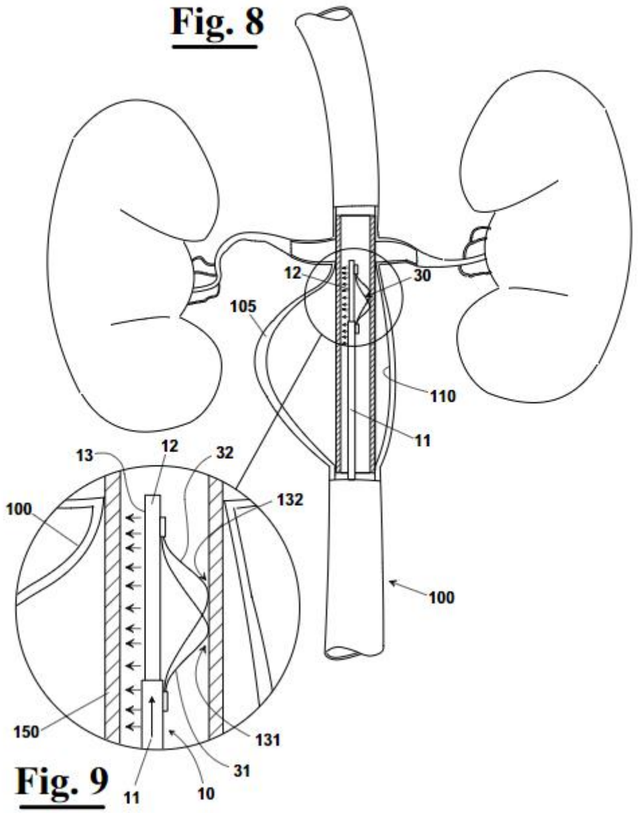


Illustrazione di una possibile configurazione realizzativa dei dispositivi ideati.



Funzione di decentramento e stabilizzazione del dispositivo D2.



Industrial applications

The present invention relates to a **device for guiding instruments for endovascular applications within anatomical lumens**, particularly but not exclusively blood vessels. The invention also relates to a system for *in-situ* fenestration of endoprostheses, particularly for the repair of abdominal aneurysms.

A commonly used technique in the past involved reconstruction by "traditional" surgery of the blood vessel, particularly the aorta, at the injured portion. However, this type of approach has significant limitations and not negligible drawback of being highly invasive to the patient. Another technique of endovascular aneurysm repair by application of endoprostheses, which is less invasive than treatment with traditional surgery, is challenging for the repair of short-collared aneurysms and requires long fluoroscopy times. In addition, fenestrated endoprostheses are patient specific, expensive, and unavailable for acute syndromes. For the aforementioned reasons, alternative techniques have been proposed, particularly *in-situ* fenestration of standard endoprostheses.

Possible developments

The present invention provides a versatile device for guiding instruments for endovascular applications, that can be used for applications in blood vessels of different calibers, particularly blood vessels with different cross sections. Its use makes the guidance:

- extremely precise of instruments for endovascular applications within vessels;
- with high stability, once the desired target has been reached without imposing constraints on the distal curvature of the device capable of approaching the target.
- for *in-situ*, particularly anterograde, fenestration of endoprostheses particularly for abdominal aneurysm repair.

The guiding device comprises (a) a **positioning catheter** configured to be introduced into the blood vessel; (b) a **locking device** configured to switch between a positioning configuration, which allows the said catheter to be moved into the blood vessel, and a locking configuration, which locks the catheter in a given position within the vessel; and (c) an **orientation catheter**, introduced into the positioning catheter, configured to vary its inclination independently of the configuration assumed by the locking device.

The research team is interested in collaborating with industrial partners and considering licensing or transfer of the patent for commercialization by interested companies.

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