

HeartAttach: Cardiology Guidewire Separator

The Cardiology department at the [Western Health and Social Care Trust \(WHSCCT\)](#) has teamed up with Ulster University's Belfast School of Art to co-design a new device to improve the clinical operator workflows for Percutaneous Coronary Intervention (PCI). [Dr Aaron Peace](#), (cardiologist) and [Dr Justin Magee](#) (product designer) have worked together towards innovative new product development and subsequently, workflow service improvements.

PCI is a procedure where stents are inserted into narrowed heart blood vessels that limit blood flow. A tactile responsive coronary guidewire, usually measuring 0.014' in diameter is used to guide stents into final position which results in widening and increased blood flow – resulting in relief of symptoms for patients. In Europe there are 1.1 Million PCI's (2018) with 27.7K increase per year (Eurostats, 2020). A major workflow issue arises in that the wires, regardless of manufacturer, look very similar in appearance. They are difficult to see and it can be difficult to recall which wire is in which blood vessel especially in dimly lit catheterisation laboratories or operation theatres. This adds to the cognitive clutter that an operator experiences while viewing moving real time images of the heart on screen, while simultaneously performing an procedure below their line of vision. The associated uncertainty adds to the increased risk of medical errors which are a major concern throughout the clinical profession. Within this context '*cardiac catheterization are significant sources of medical cardiovascular liability*' (Rodziewicz & Hipskind 2020). Currently interventional cardiologists may use a piece of gauze to help identify a specific guidewire as no current solution is adequate to enable an uninterrupted operator workflow. Furthermore, a gauze may accidentally be removed during an operation during hygiene protocols, incurring corrective delays and error may introduce microfilaments into the body.

The Design and its Benefits

Observation analysis of the operator procedures was conducted at WHSCCT. This informed design decision making within a co-creative process between design and clinical experts. An innovative product was iteratively developed under critical review and functional testing by a team of consultant cardiologists. Novel features were defined and incorporated permitting normal operative workflow of individual guidewires. The benefits of the novel product design includes:

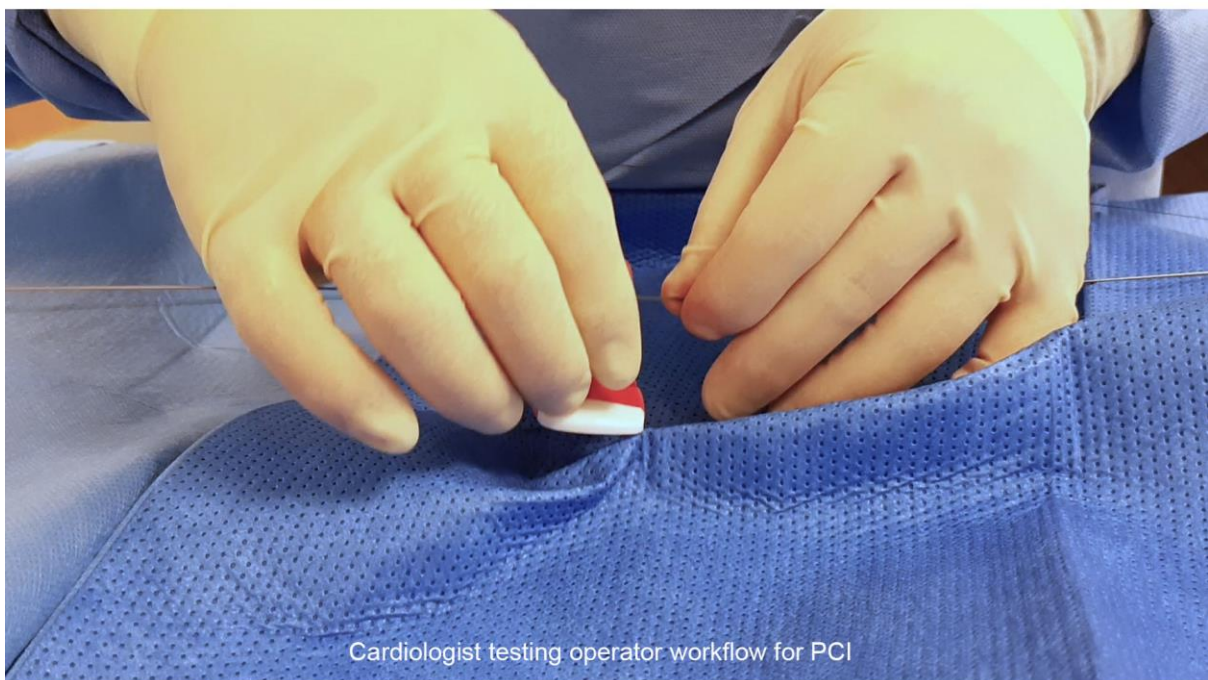
- Enablement of an unobtrusive workflow environment permitting normal operative procedures
- Visually identifies the artery of insertion, clarifying which wire is in which artery.
- Permits one hand relocation and full control of the guidewire while the device is in use
- Avoids entanglements and unintentional removal errors related to guide wires where multiple wires are in use.
- Avoids touching or over manipulation of the wire thus avoiding kinking and damage to the wire
- Offers guidewire management where multiple wires are in use for all diameters of wires and associated equipment.
- Any vascular procedure using any wire diameter can benefit from this design system.

The HeartAttach product addresses this clinical need. The improvements embodied in this product meet recommendation 240 of the Francis Inquiry (Francis, 2013) including improvement of clinical workflow management, operative communication, hygiene best practice, and reduction of cognitive clutter.

The product has been developed through several prototype variations following clinical feedback, and exists as an injection moulded prototype.

Support

The research has been funded by Health & Social Care for Northern Ireland (HSCNI), WHSCT R&D Fund and Ulster University including the Higher Education Innovation Fund (HEIF) Commercial Impact Award. [HSC Innovations](#) facilitated discussions with potential commercial partners with [confidentiality agreements](#) in place.



References

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