



[Short Communication]

Helpful techniques for usage of catheter introducers (catheter inserters) : processing using microguidewire introducers or microguidewire shaper

Yousuke Watanabe¹⁾, Akihiko Adachi^{1,2,3)}, and Yasuo Iwadate^{1,3)}

¹⁾ Department of Neurological Surgery, Chiba University Hospital, Chiba 260-8677. ²⁾ Department of Neurosurgery, Narita Red Cross Hospital, Narita 286-8523. ³⁾ Comprehensive Stroke Center, Chiba University Hospital, Chiba 260-8677.

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Abstract

Endovascular therapy has gained popularity over the years alongside open surgery, radiosurgery, and medical therapy. Various devices are used in endovascular therapy, including the catheter introducer (also called catheter inserter), which is commonly used when catheters (guiding balloon catheters, thrombectomy catheters, or microcatheters) are introduced into hemostasis valves or Y connectors. However, it has not been officially described in any medical article, technical book, or proceedings. There are two kinds of introducers, slit type (pull-out type) and split type (peel-away type); the former is difficult to attach over the middle of the catheter, the latter, meanwhile, cannot be reused. We found that widening the slit of the pull-out type introducer and opening only one side of the split type introducer solve these problems, respectively. Although these processes may seem trivial, they shorten the procedure time and consequently improve treatment results.

Key words: catheter introducer, catheter inserter, endovascular therapy, guiding catheter, microcatheter

Endovascular therapy is gradually pervading clinical departments like cardiology, radiology, pulmonology, orthopedics, emergency medicine, neurosurgery [1], and otorhinolaryngology [2]. Among the devices used in endovascular surgery, some of the guiding catheters and microcatheters have balloons, delicate soft tips, or special (ready-made or hand-made) shapes at the tip. A catheter introducer (also known as catheter inserter) is used to protect these structures (i.e., to not tear the balloon, destroy the soft tip, or break the special shapes

at the tip) (Fig. 1a-h).

This article features slit type introducers and split type introducers. The following devices are shown in the photographs as examples. Fig. 1c: Medikit inserter 4.0Fr (Medikit, Miyazaki, Japan); Fig. 1d: Headway straight reshapable microcatheter [1] (MicroVention-Terumo, CA, USA); Fig. 1e: DeFrictor Nano catheter (Medico's Hirata, Osaka, Japan); Fig. 1f: Scepter balloon microcatheter (MicroVention-Terumo); Fig. 1g: FlowGate balloon guiding catheter (Concentric Medical-Stryker, CA, USA); Fig. 1h: Optimo balloon guiding catheter (Tokai Medical Products, Aichi, Japan). The metal sticks used for processing these catheter introducers were the microguidewire shaper attached to Chikai Microguidewire (Asahi Intecc, Nagoya, Japan)

Address correspondence to Dr. Akihiko Adachi.
Department of Neurological Surgery, Chiba University, 1-8-1,
Inohana, Chuou-ku, Chiba 260-8670, Japan.
Phone: +81-43-226-2158. Fax: +81-43-226-2159.
E-mail: adachi-cib@umin.ac.jp

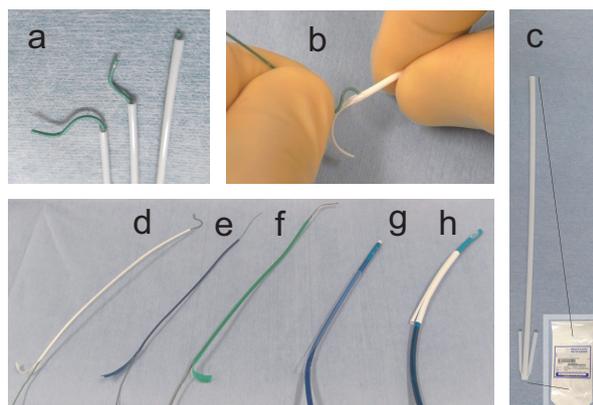


Fig. 1

- Catheter introducers (catheter inserters) make it easy to introduce a catheter with a strong shape, fragile tip, or balloon, by protecting these features.
- Loading a catheter introducer from the catheter tip after strong shaping is difficult.
- h. Various catheter introducers. Packaged (c) is provided separately whereas (d-h) are adjunctive parts of a catheter set; (c-f) are for microcatheters while (g) and (h) are for balloon guiding catheters; (d-f) are slit type introducers, (c), (g), and (h) are split type introducers.

and the 0.022-inch microguidewire introducer (Kaneka Medix, Osaka, Japan).

A slit type introducer has to be preloaded before shaping the microcatheter. However, if preloading has been overlooked, or while reloading, loading should be done from the middle of the microcatheter while opening the introducer's slit because loading from the catheter tip may break the unique shape or other features (Fig. 1b).

As the slit of the introducer is hidden under the overlapping structure (Fig. 2a), loading from the middle of the microcatheter tends to take time. In this situation, rubbing the unslit side of the introducer once strongly with a microguidewire introducer or a microguidewire shaper opens the slit wider, making it easy to reload (Fig. 2b-f). Split introducers are difficult to reuse because the end splits away into two warped pieces (Fig. 3a). Splitting only one side of the introducer makes it reusable, similar to a slit type introducer (Fig. 3b-d).

Catheter introducers are classified as slit type and split type. Slit type introducers are sometimes hard to load from the middle of a catheter, without processing. Split type introducers are almost impossible to reuse

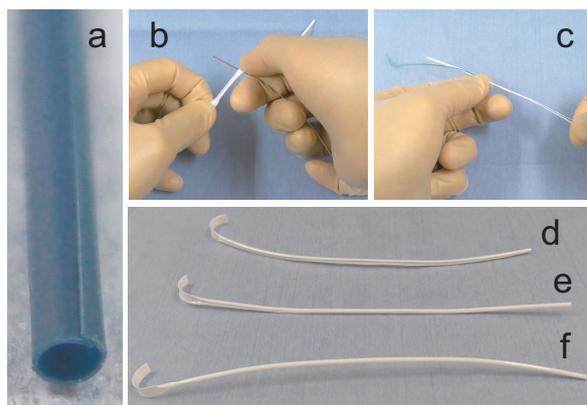


Fig. 2

- Loading slit type introducers from the middle of a catheter is difficult because of the overlap of wrapping structures.
- , c. Widening the slit reduces the overlap, making the catheter introducer easy to load from the middle of a catheter. This is done by rubbing the unslit side using a metal stick such as a microguidewire introducer or a microguidewire shaper.
- Overly opened slit: cannot hold a microcatheter
- Adequately opened slit
- Unopened slit: before processing

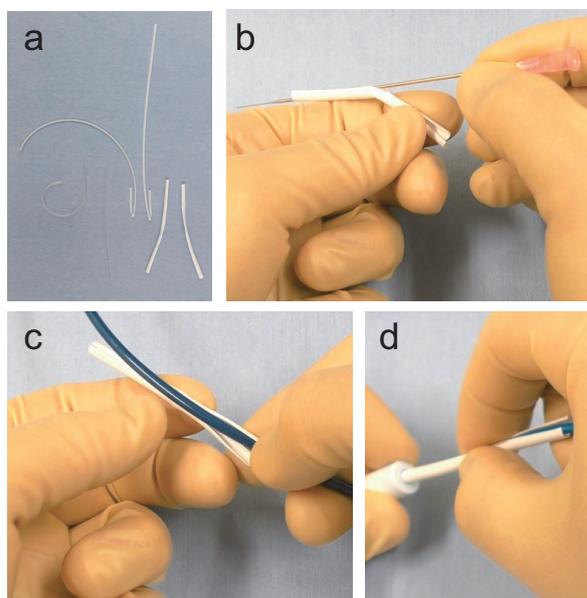


Fig. 3

- Split type introducers often come attached to balloon-guiding catheters, thrombectomy catheters, or are separately provided. Once peeled away, split type introducers are almost impossible to reuse.
- d. They can be made reusable by splitting only one side.

once the end has been peeled away. On the other hand, some guiding catheters and microcatheters tend to be shaped before introduction; in these cases, catheter

inserters cannot be loaded from the tip. Furthermore, some thrombectomy catheters tend to be retrieved and reintroduced multiple times. Our techniques (widening the slit type introducer and opening only one side of the split type introducer) overcame these disadvantages and presented a solution to these problems.

We proposed techniques to circumvent the shortcomings of the existing catheter introducers, which are difficult to reload or reuse, by widening the slit introducer or opening only one side of the split introducer respectively.

Contributors

Y. W. drafted the manuscript, A. A. initiated the project, and Y. I. supervised all aspects of the work.

Conflicts of interest

The authors declare that they have no conflicts of interest, either financial or non-financial, with respect to the contents of this article.

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