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Three-dimensional optical coherence tomography with the current version (E.4 [Build 10457]) of Metallic Stent Optimization Software is a mirror image

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Interventional cardiologists can use 3-dimensional optical coherence tomography (3D-OCT) to intraprocedurally check a recrossed cell on a jailed side branch ostium (SBO) [1]. Although 3D-OCT on the console was useful, 3D-OCT with the current version (E.4 [Build 10457]) of Metallic Stent Optimization Software (St. Jude Medical, Minneapolis, MN, USA) a mirror image was presented.

The struts of the Ultimaster (Terumo, Tokyo, Japan) had alternating 3- and 5-side parts between links. The photograph of the outside view of the Ultimaster, that was deployed on the phantom vessel and kissing balloon inflation was performed, this indicated that the 3-side part of a strut was arrayed at the upper left of the link (Fig. 1A). The photograph of the inside view of the Ultimaster, that was expanded in the air, longitudinally cut and opened, indicated that the 3-side part of a strut was arrayed at the upper right of the link (Fig. 1B). 3D-OCT with the current version (E.4 [Build 10457]) of the Metallic Stent Optimization Software indicated that the 3-side part of a strut was arrayed at the upper left of the link on the inside view of the Ultimaster in clinical cases, and consequently, this image was a mirror image (Fig. 1C). According to the manufacturer, this mirror image was caused by a specification in the reconstruction process. Nakao et al. [2, 3] reported that the stent automatic enhancement system, named the instant stent-accentuated 3D-OCT (iSA3D-OCT), could display the stent-enhanced 3D image without strut detection from original OCT images by the freeware package ImageJ (National Institutes of Health, Bethesda, MD) with self-made macro-programs. The correct 3D-image in the same position and rotation as Figure 1C by iSA3D-OCT shown in Figure 1D, and the 3-side part of a strut was arrayed the same as the photograph of the inside view as Figure 1B.

When a distal stent cell on an SBO is divided by a stent link, adequate (clockwise or counterclockwise) rotation of a guidewire may lead to recrossing through a larger distal cell which may be advantageous to dilate. In a bifurcation lesion treated with the Japanese design of the Nobori (Terumo) on a main vessel followed by recrossing to a side branch, according to 3D-OCT with the current version (E.4 [Build 10457]) of the Metallic Stent Optimization Software, a guidewire is recrossed to a small distal cell at the left side of an SBO (Fig. 1E), and therefore, the clockwise rotation of a guidewire may lead to recrossing through a larger distal cell at the right side of an SBO. Correctly, according to usual frequency-domain OCT (Fig. 1F) and iSA3D-OCT (Fig. 1G), a guidewire is recrossed to a small distal cell at the right side of an SBO, and therefore, the counterclockwise rotation of a guidewire leads to recrossing through a larger distal cell at the left side of an SBO.

The manufacturer will repair this specification in the next version of the Metallic Stent Optimization Software. Until then, interventional cardiologists should pay careful attention when manipulating a guidewire under the guidance of the 3D-OCT using the current version (E.4 [Build 10457]) of the Metallic Stent Optimization Software.

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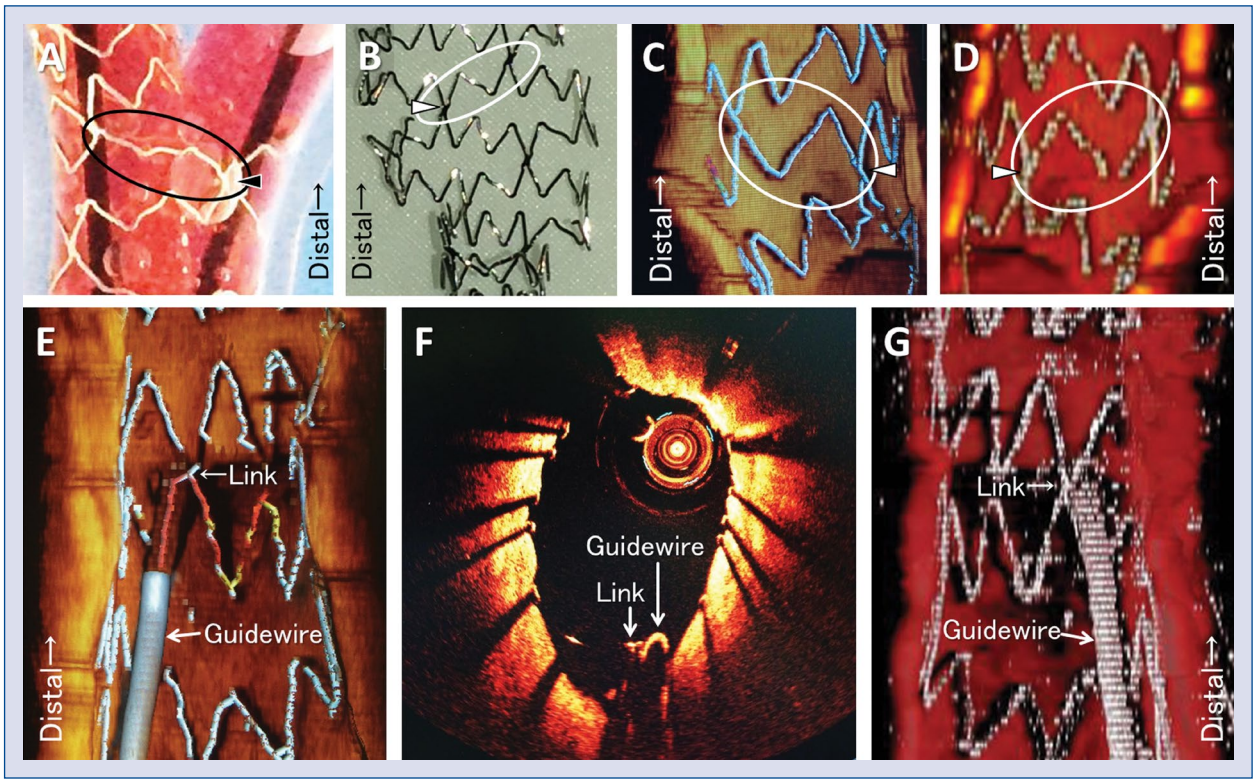

Figure 1. A. The photograph of the outside view of the Ultimaster that was deployed on the phantom vessel and performed kissing balloon inflation. The black oval encircles the 3-side part of a strut arrayed at the upper left of a link indicated by the black arrowhead; **B.** The photograph of the inside view of the Ultimaster that was expanded in the air, longitudinally cut and opened. The white oval encircles the 3-side part of a strut arrayed at the upper right of a link indicated by the white arrowhead; **C.** The inside view of the Ultimaster in a clinical case by 3-dimensional optical coherence tomography (3D-OCT) with the current version (E.4 [Build 10457]) of the Metallic Stent Optimization Software. The white oval encircles the 3-side part of a strut arrayed at the upper left of a link indicated by the white arrowhead; **D.** The inside view of the Ultimaster in the same position and rotation as Figure 1D by the instant stent-accentuated 3D-OCT (iSA3D-OCT). The white oval encircles the 3-side part of a strut arrayed at the upper right of a link indicated by the white arrowhead. The main vessel of the bifurcation lesion was treated with the Japanese design of the Nobori, and a guidewire was recrossed through a small distal cell on a jailed side branch ostium, confirmed by 3D-OCT with the current version (E.4 [Build 10457]) of the Metallic Stent Optimization Software (**E**), usual frequency-domain OCT (**F**), and iSA3D-OCT (**G**).

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