

## Reply to Letter to the Editor: Provisional (Reverse) Double-Kissing Nano-Culotte Stenting

To the Editor,

We are very grateful for the valuable comments of the authors on our manuscript entitled "A Novel Coronary Bifurcation Stenting Technique: Double Kissing Nano-Culotte Stenting."<sup>1</sup> In particular, we thank the authors for their detailed consideration of the advantages and disadvantages of this innovative stenting technique. Coronary bifurcation lesions are still of great interest among interventional cardiologists. Despite increasing operator experience and advanced technology, the optimal 2-stent strategy remains controversial issue, and the optimal treatment strategy seems to have been debated for many years.<sup>2</sup> In our novel technique, we focused the stenting strategy closest to the de novo vascular structure. However, some pitfalls and troubleshooting in this technique need further clarification.

Several 2-stent techniques have been described in the literature for bifurcation lesions, including culotte, crush, T stenting, and their derivatives.<sup>2,3</sup> Unfortunately, no current technique can prevent incorrect stent placement problems such as incomplete coverage of the ostium by the stent strat and excessive stent strat insertion into the main branch. Ideally, after main branch and side branch stenting, full coverage of the side branch ostial and minimal main branch stent protrusion and consequent minimal metallic load is desired. Clinical improvement has been achieved since the introduction of mini-crush, double-kissing (DK) crush, DK miniculotte, and T and minimal protrusion stenting techniques<sup>4</sup>; however, considering the developmental stages of the technique, they did not meet ideal criteria such as "full coverage, minimal protrusion, and minimal disruption of stent structure."

Focusing on all these concerns, we developed the DK nano-culotte technique, which ensures minimal stent structure disruption and optimal coverage of the side branch ostium. Although DK nano-culotte stenting seems to be a viable method regardless of the bifurcation angle, it will need further evaluation. Besides, by using the most distal strat at narrower angles, there is no risk of excessive protrusion into the main vessel, unlike the nano-crush technique. Moreover, it seems rational to target the last 2 strats due to the risk of geographic miss at narrow angles. These hypotheses will need to be supported by further bench-testing studies. Additionally, DK nano-culotte may be performed in wider bifurcation angles. In this situation, the stent structure to be used becomes more important. Stent platforms with ultra-thin strats or without large open cell design may result in Napkin ring formation or side branch stent malformation and apposition.<sup>5</sup> These are also technical limitations of culotte stenting technique, regardless of our modified strategy. Another point is that it was demonstrated that DK balloon dilatation has a protective effect on side branch ostial stent deformation, which is a determinant factor in long-term adverse clinical outcomes. Therefore, we support DK balloon dilation in this technique. On the other hand, the Szabo technique is a method that requires operator experience, and it has some limitations and complications of its own. Hence, we totally agree with your concerns that operators who will use our technique should have sufficient experience with the Szabo technique. Lastly, the DK nano-culotte stenting technique can be applied not only in complex bifurcation lesions but also in a stepwise provisional approach. Here, we have briefly described an example of the provisional DK nano-culotte.



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### LETTER TO THE EDITOR REPLY



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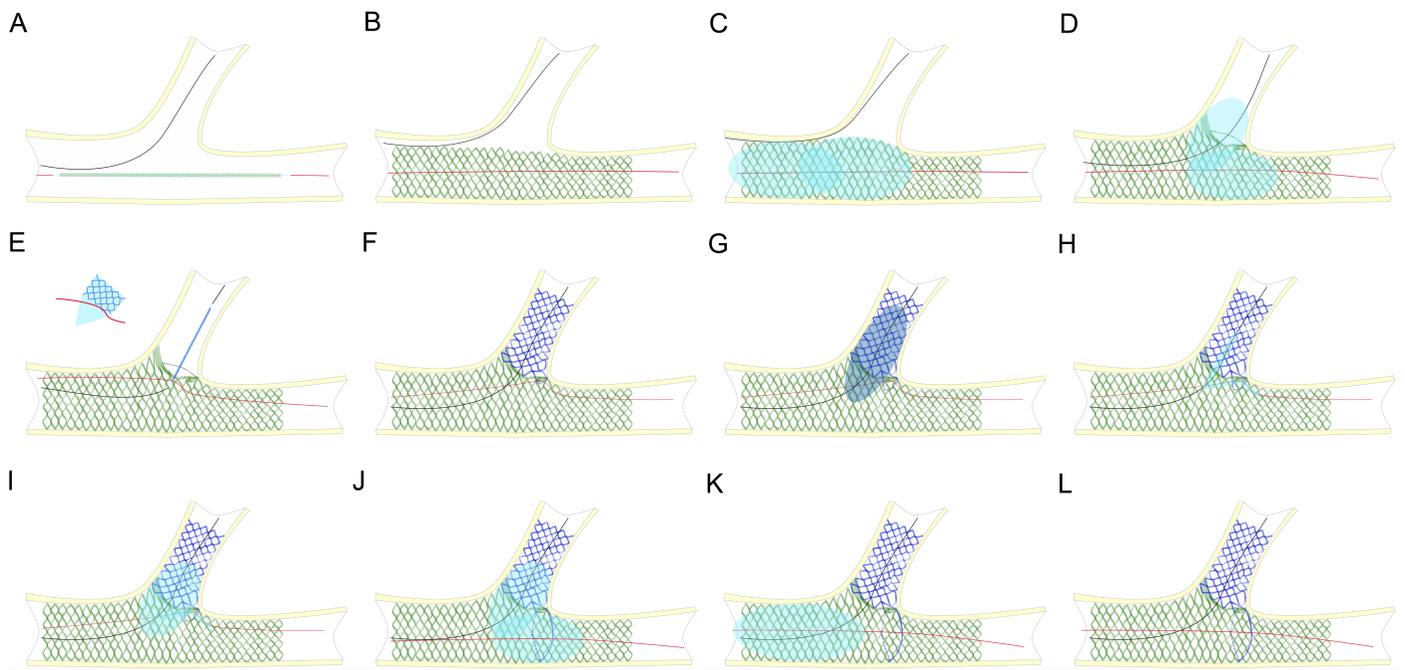
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**Figure 1. Provisional Double-Kissing Nano-Culotte Stenting Technique**

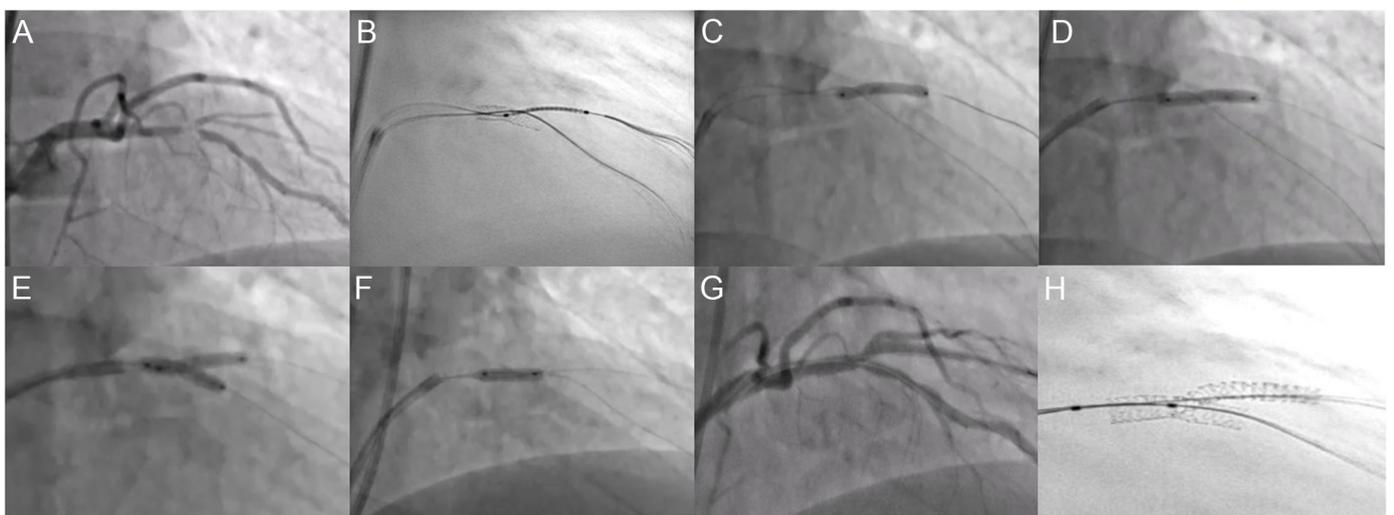
A 44-year-old male patient was presented with a history of stable angina pectoris lasting for 5 months. The targeted medical history included stent implantation in the left anterior descending (LAD) artery 4 years ago. Electrocardiography (ECG) and echocardiographic findings were unremarkable. Myocardial perfusion imaging performed with Tc 99m-MIBI showed >10% reversible perfusion defects in the anterior and anterolateral wall. The patient was then referred for diagnostic coronary angiography (CA). During CA, a Medina 1.1.1 bifurcation lesion was detected in the LAD-first diagonal (D1) artery. After the diagnostic coronary angiography, the operators decided to revascularization with the provisional DK nano-culotte technique, similar to the provisional

approach and because of the stent in the LAD. The steps of this technique are briefly described below (Figure 1).

**Step by Step Provisional Double-Kissing Nano-Culotte Stenting Technique**

#1. Guidewires are advanced distally in the main vessel (LAD) and side branch (D1) (Figure 1A).

#2. The main vessel stent is placed with a provisional approach, in accordance with the distal main vessel diameter (Figure 1B). Then, proximal optimization is performed with a balloon of suitable size for the proximal main branch (Figure 1C). If intervention is required for the side branch, the



**Figure 2. Provisional Double-Kissing Nano-Culotte Stenting of the Patient**

side branch is rewired from the distal cell of the main branch stent.

#3. First-kissing balloon dilatation is performed with balloons sized 1:1 according to the distal main vessel and side branch diameters (first, the main vessel balloon is inflated to avoid the distortion of the main vessel stent and then side branch balloon is inflated) (Figure 1D). Then, balloons are deflated simultaneously.

#4. According to the distal side branch, a 1:1 sized side branch stent is selected and prepared outside of the catheter. For only the most proximal cell opening, the stent sheath is opened only slightly from the proximal part, the remaining part is not removed, and the stent balloon is inflated with low pressure (2-4 atm). Only the most proximal cell of the stent is partially opened, and the balloon is deflated. The guidewire in the main vessel (LAD) is crossed from the opened stent cell and the side branch (D1) stent is advanced over the side branch (D1) guidewire (Figure 1E).

#5. The distal part of the stent is prevented from advancing at the side branch ostial by the main branch wire. At this point, the side branch stent is implanted and the proximal optimization is performed (Figure 1F and G).

#6. The main vessel (LAD) balloon is advanced over the guidewire and advanced through the single-opened side branch (D1) stent strut (no need for rewiring) and second-kissing balloon dilatation is performed with balloons sized 1:1 according to the distal main vessel and side branch

diameters (first, the SB balloon is inflated to avoid the distortion of the SB stent and then MV balloon is inflated) (Figure 1H–J). Then, balloons are deflated simultaneously.

#7. Proximal optimization is performed with a 1:1 sized balloon to the proximal main vessel (Figure 1K–L).

The technical steps are also briefly summarized in Figure 2 and Video 1.

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**Video 1:** Step by Step Provisional Double-Kissing Nano-Culotte Stenting Technique

## REFERENCES

1. Kahraman S, Çizgici AY, Ertürk M. A novel coronary bifurcation stenting technique: double kissing nano-culotte stenting. *Anatol J Cardiol.* 2023;27(2):113-116. [\[CrossRef\]](#)
2. Kahraman S, Güner A, Çizgici AY, Ertürk M. Current evidence and future perspective for coronary bifurcation stenting. *Türk Kardiyol Dern Ars.* 2022;50(8):595-609. [\[CrossRef\]](#)
3. Kurt M, Tanboğa IH, Karakaş MF, et al. Clinical and morphological evaluation of coronary bifurcation lesions. *Türk Kardiyol Dern Ars.* 2013;41(3):207-211. [\[CrossRef\]](#)
4. Sawaya FJ, Lefèvre T, Chevalier B, et al. Contemporary approach to coronary bifurcation lesion treatment. *JACC Cardiovasc Interv.* 2016;9(18):1861-1878. [\[CrossRef\]](#)
5. Murasato Y, Meno K, Ura Y, Takenaka K. Napkin ring formation in culotte stenting using current-generation drug-eluting stents in left main coronary artery bifurcation. *EuroIntervention.* 2022;17(18):1488-1489. [\[CrossRef\]](#)