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A 69-year-old woman with stable angina pectoris was enrolled in the randomized, double-blind RAndomized study with the sirolimus-eluting VElocity balloon-expandable stent in the treatment of patients with de novo native coronary artery Lesions (RAVEL) trial. Coronary angiography revealed a proximal stenosis in the left circumflex coronary artery (Figure 1A). A 3.0×18 mm sirolimus-eluting Bx VELOCITY stent (Cordis Corp, Johnson & Johnson) was implanted with a satisfactory result (Figure 1B). Intravascular ultrasound (IVUS) images were then obtained with ECG-gated pullback, showing stent struts well apposed to the vessel wall (Figure 1D). At 6-month follow-up, angiography showed no restenosis (Figure 1C), whereas IVUS images revealed good stent apposition with minimal neointimal hyperplasia and some tissue disappearance between stent struts (Figure 1E and 1F). To further evaluate these observations, we combined biplane angiography and IVUS (ANGUS) for a true 3-dimensional reconstruction of the stented region. Figure 2 shows the intimal thickness color-coded on the stent surface. The blue area seen on the proximal stent surface after the procedure (Figure 2A and 2B) relates to a side branch. The images at follow-up (Figure 2C and 2D) identify additional blue areas, indicating disappearance of tissue between stent struts and lumen enlargement. Localized neointimal hyperplasia (red area) was also observed. In addition, there are small changes in 3D stent shape. In the RAVEL trial, the late loss averaged −0.01±0.33 mm, consistent with the presence of lumen enlargement in some patients.

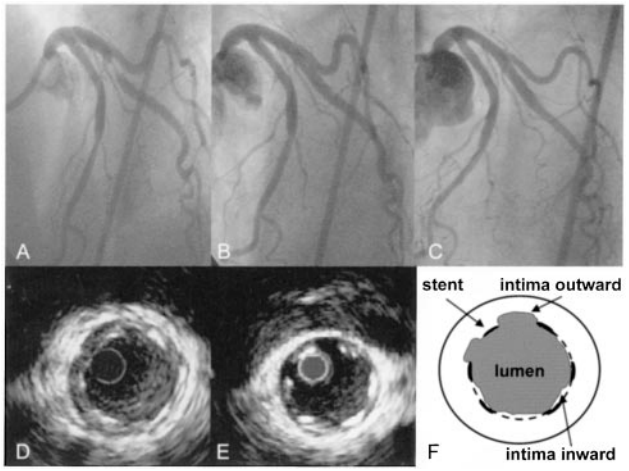

Figure 1. Coronary angiograms in left anterior oblique projection showing stenosis in the proximal segment of the left circumflex coronary artery (A), a good final result of angioplasty (B), and no restenosis at 6-month follow-up (C). The IVUS images show the stent well apposed to the vessel wall both after the procedure (D) and at follow-up (E). The schema of the IVUS image at follow-up (F) depicts minimal neointimal hyperplasia and the disappearance of tissue between stent struts.

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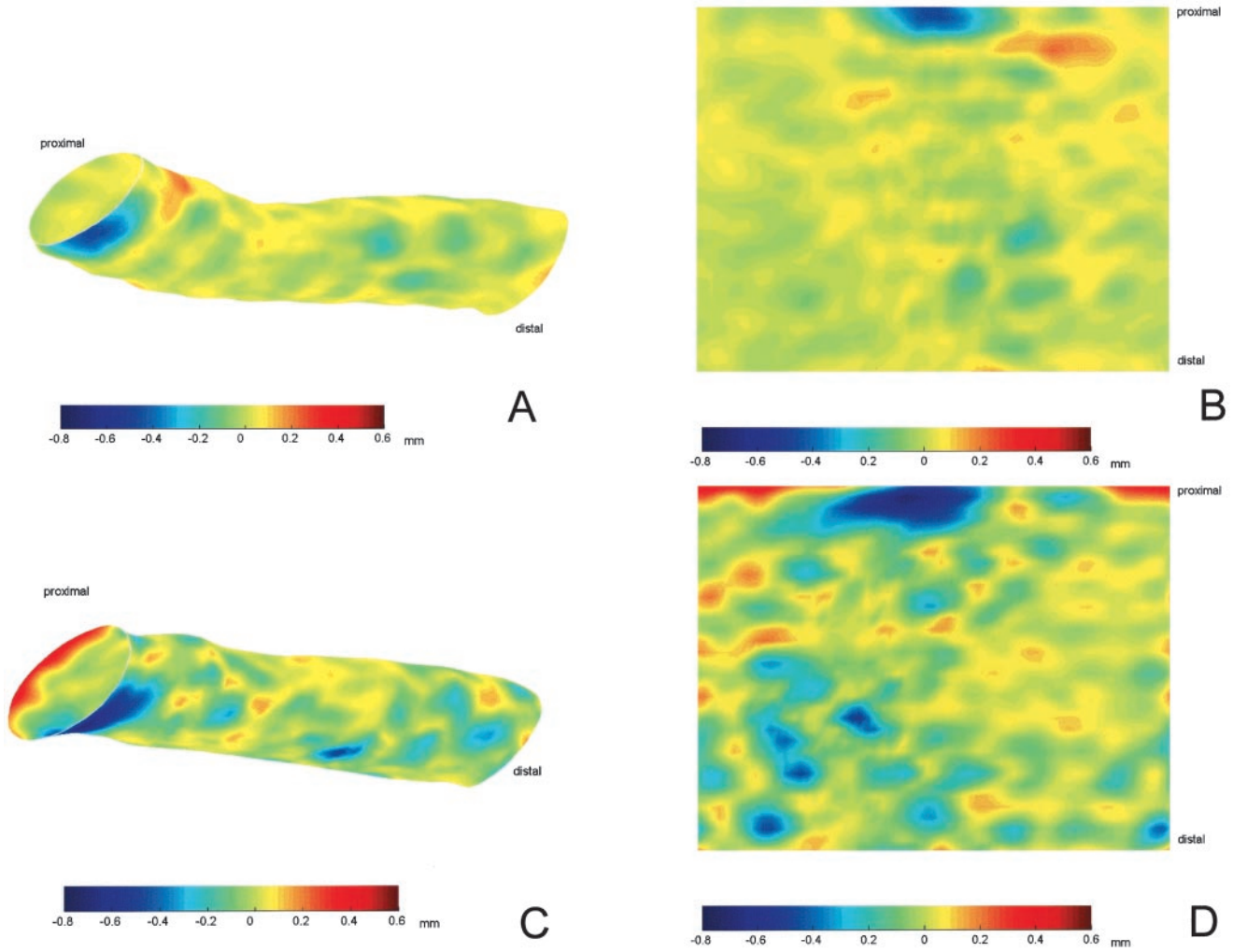

Figure 2. Local intimal thickness color-coded and projected on the stent surface. The color code indicates the relative position of lumen surface to the stent surface as defined in Figure 1F and ranges from −0.8 mm (blue) to 0.6 mm (red). A and C are the 3D-reconstructed images after the procedure and at follow-up, respectively. B and D are the unfolded images of A and C, respectively. The post-procedure image (A) shows a small thrombus (orange) opposite the side branch. At follow-up, the yellowish to orange areas demarcate the individual stent struts covered by some intimal hyperplasia.