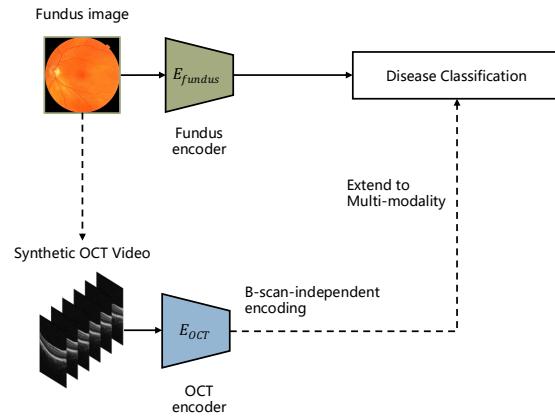
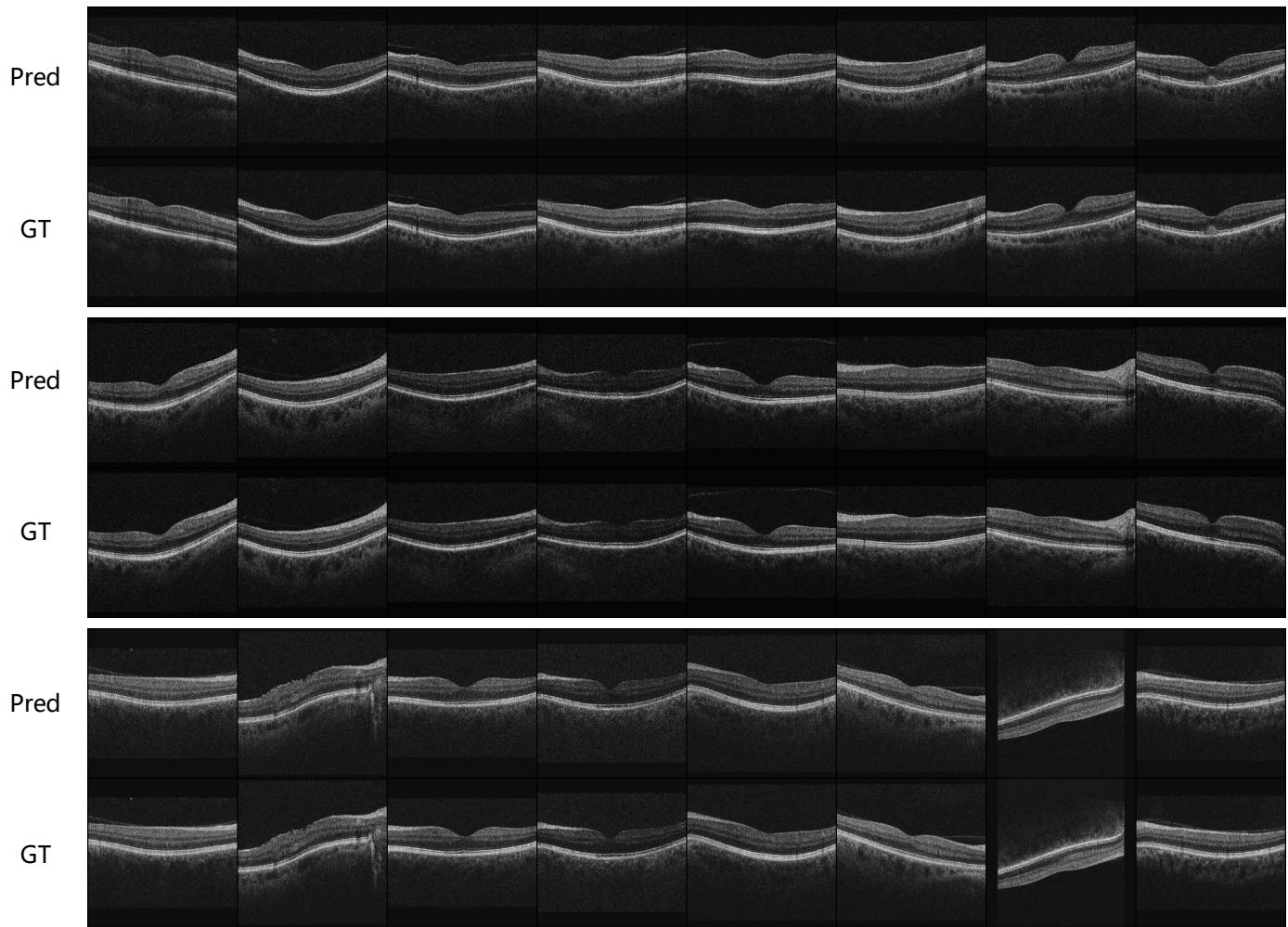


**Supplementary Fig. 1: The training scheme of Fundus2OCT.** We introduced a two-stage scheme. a) We started by training an autoencoder to learn a compressed latent space of lower dimensionality. b) Our subsequent diffusion model is designed to work with this learned latent space. In Fundus2OCT, each model is trained independently.

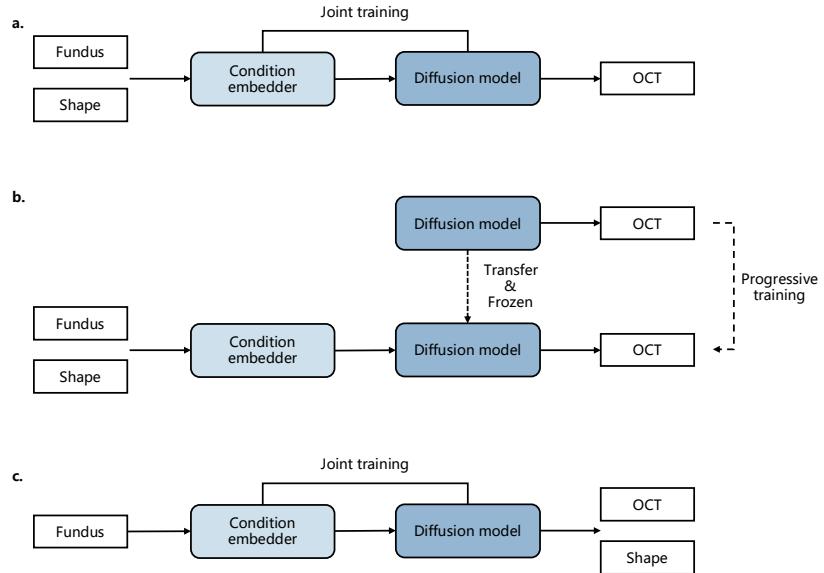


**Supplementary Fig. 2: The training procedures for both the baseline and augmented classifiers.**

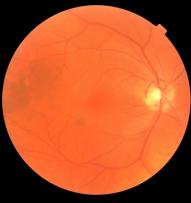
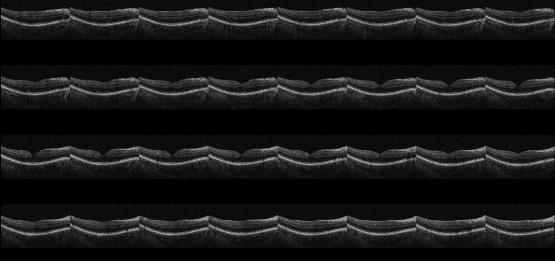
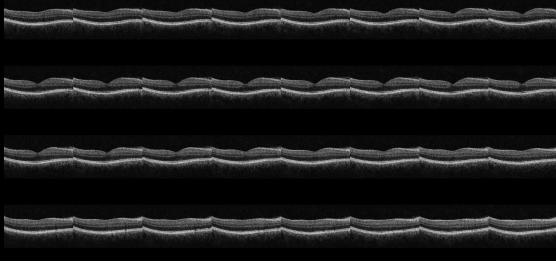
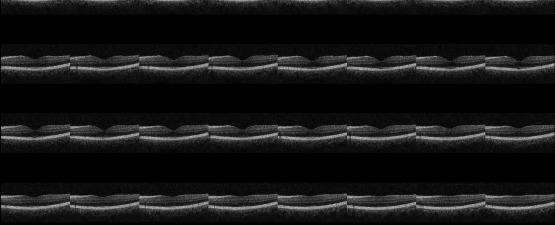
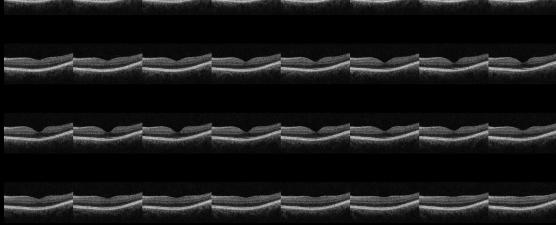
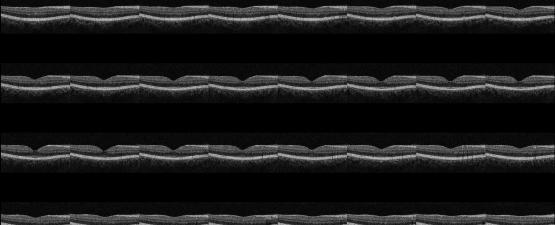
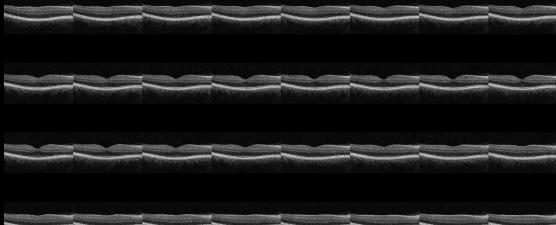
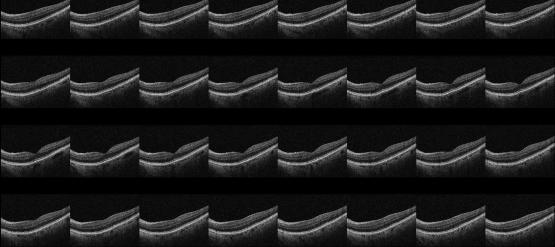
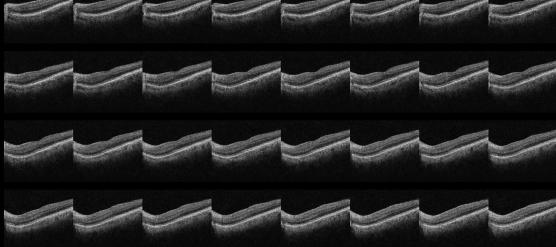
We trained the baseline classifier using fundus photographs only. Subsequently, fundus photographs were used as input to Fundus2OCT model, which generate the corresponding 3D OCT images. The augmented classifier was then trained using both the original fundus photographs and the synthetic OCT images.



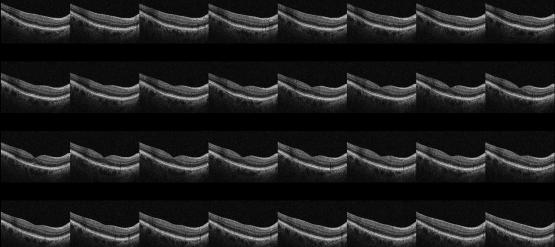
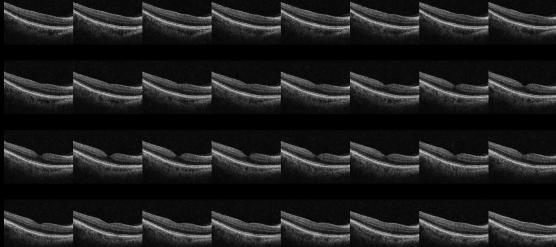
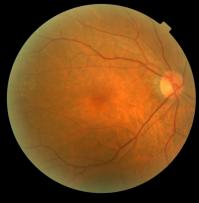
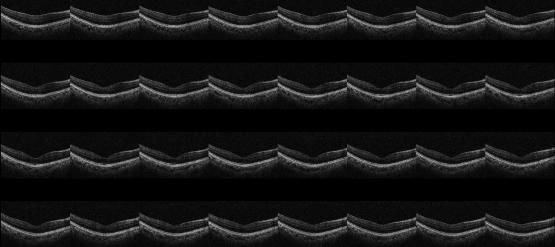
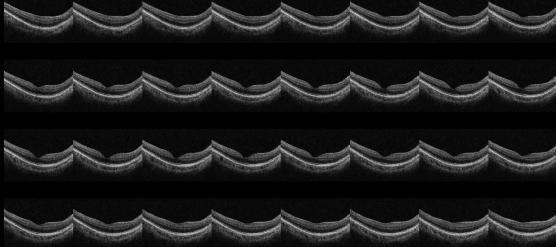
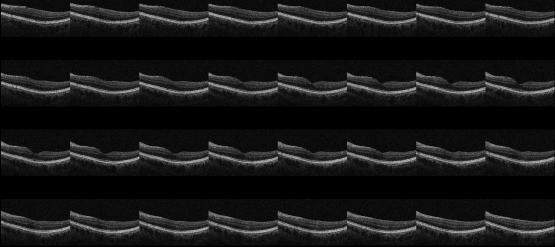
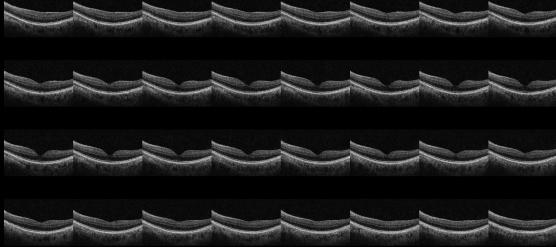
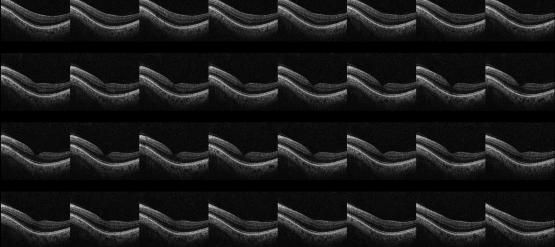
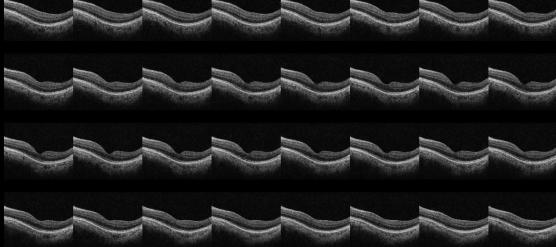
**Supplementary Fig. 3: Reconstructed B-scans from VAE in Fundus2OCT.**



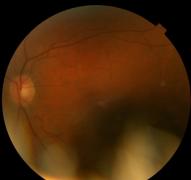
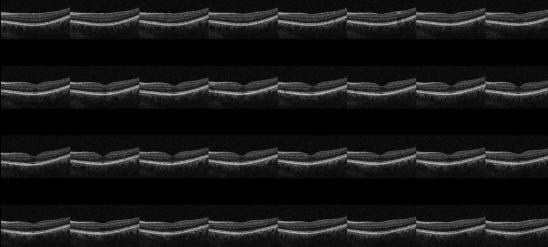
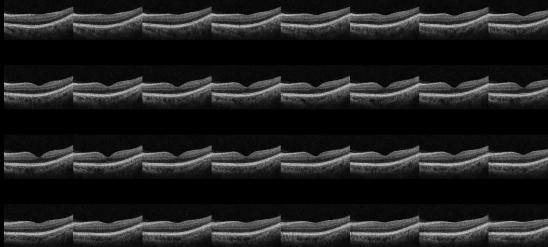
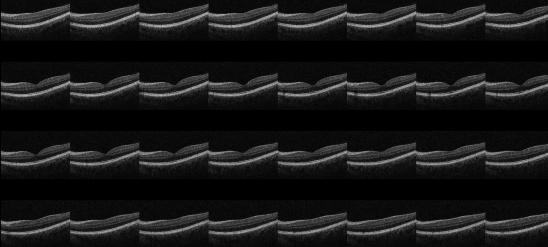
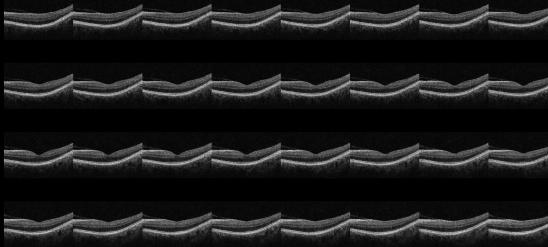
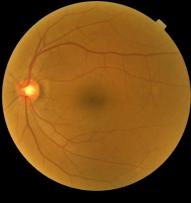
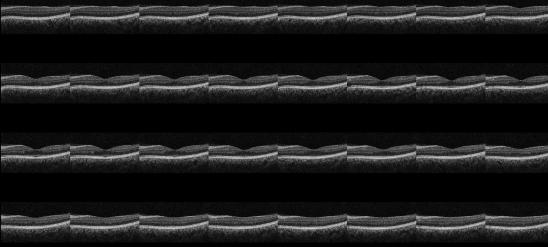
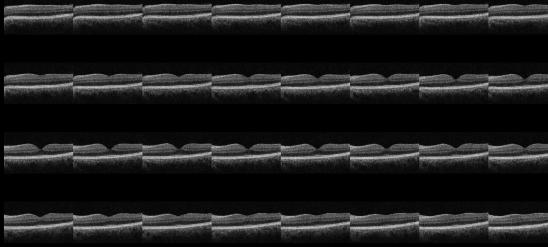
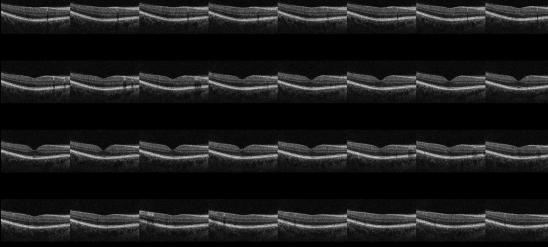
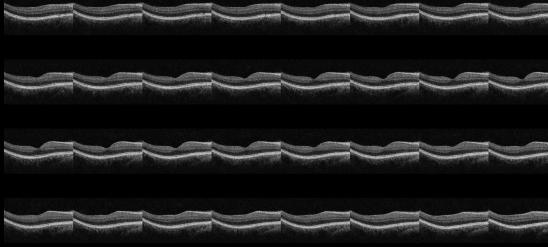
**Supplementary Fig. 4: The distinction between Fundus2OCT and competing methods.** a) A diffusion model conditioned on the fundus image with retinal shape; b) A pretrained unconditional diffusion model finetuned into a conditional generative model; c) **Fundus2OCT**: A diffusion model conditioned on the fundus image and outputting the 3DOCT image along with its retinal shape.

Fundus condition	Real OCT	Generated OCT
		
		
		
		

**Supplementary Fig. 5: Randomly generated 3D OCT images from Fundus2OCT.**

Fundus condition	Real OCT	Generated OCT
		
		
		
		

**Supplementary Fig. 6: Randomly generated 3D OCT images from Fundus2OCT.**

Fundus condition	Real OCT	Generated OCT
		
		
		
		

**Supplementary Fig. 7: Randomly generated 3D OCT images from Fundus2OCT.**

**Supplementary Table 1: Other metrics from human assessment for authenticity**

Class	Clinician 1			Clinician 2		
	Precision	Recall	F1-score	Precision	Recall	F1-score
Real	0.49	0.70	0.58	0.54	1.00	0.70
Synthetic	0.48	0.28	0.35	1.00	0.14	0.25