

Supplementary Material

The 2.5D failure mode

Fig. 1 illustrates how a standard 2.5D diffusion model, applied without initial through-plane restoration, reconstructs a degraded thin structure. Conditioned on interpolated neighbors that disagree about the structure’s location along z , the sampler recovers plausible in-plane detail but cannot resolve the through-plane ambiguity: the thin structure is rendered sharply within each slice yet remains broken and discontinuous across slices. This motivates our two-stage design, in which through-plane structure is restored before slice-wise refinement.

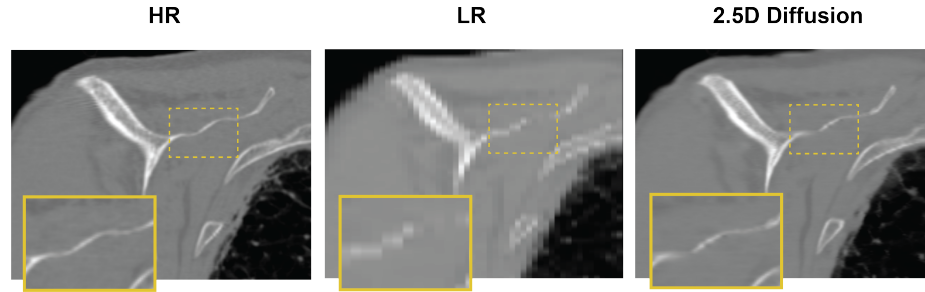


Fig. 1. Thin-structure degradation and reconstruction by a 2.5D diffusion model without initial restoration, shown in a coronal view. From left to right: high-resolution reference (HR), degraded low-resolution input (LR), and the 2.5D diffusion reconstruction. Dashed boxes mark the focus region; solid boxes show the corresponding zoom-in. The reconstruction restores in-plane appearance but fails to recover a continuous thin structure.