

# Teeth Reconstruction and Performance Capture Using a Phone Camera: Supplementary Material

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## A. Additional results on the synthetic dataset

We present more results to demonstrate our method’s performance across varied tooth shapes, face poses and face expressions on the synthetic dataset, shown in Fig. 3. We visualize the quantitative comparison on a specified subject. The metric for each frame is displayed as a line chart in Fig. 2, while the visualization heatmap is shown in Fig. 4.

## B. Missing tooth and extreme dental shape

Shown in Fig. 1, the first row shows a child with a missing tooth, and our approach works well, which is benefited from the DMM’s compositional component-wise representation and our tooth-tailored differentiable rendering. The second row demonstrates that our method reasonably handles irregular dentition.

## C. Potential impact of teeth on face

We evaluated Chamfer distance on facial regions across the three synthetic sequences, comparing against a baseline without teeth tracking. Our method’s error ( $1.6240\text{e-}04$ ) is on par with the baseline ( $1.6452\text{e-}04$ ), demonstrating comparable performance in facial reconstruction while providing the additional benefit of teeth tracking. Further, we investigated our method’s effect on facial pose stability using a real sequence with static head pose and varied expressions. Head pose jitter, measured as angular velocity, was 12.3% lower with our approach ( $1.7222\text{e-}03$  rad/s) compared to the baseline without teeth tracking ( $1.9639\text{e-}03$  rad/s), indicating improved stability, because teeth are fixed on the skull and thus they provide useful cues to estimate head poses.

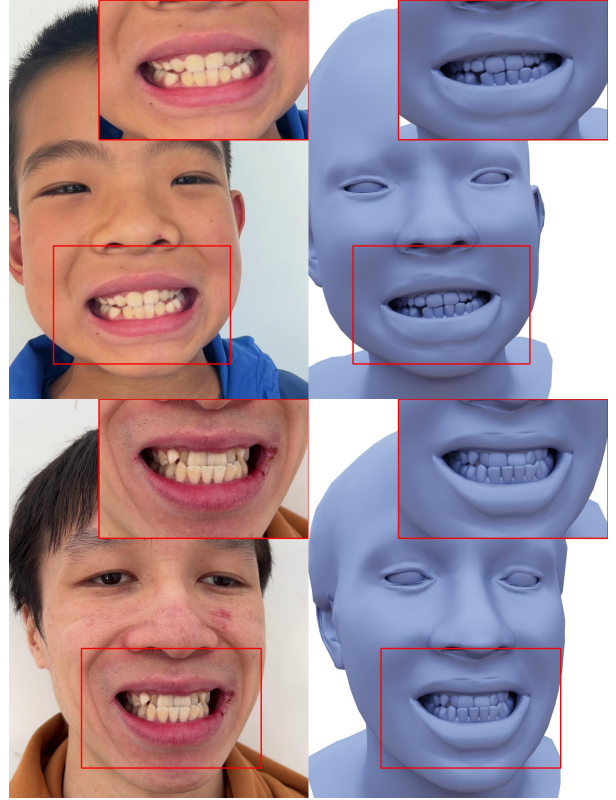


Figure 1. Results with missing tooth and extreme dental shape.

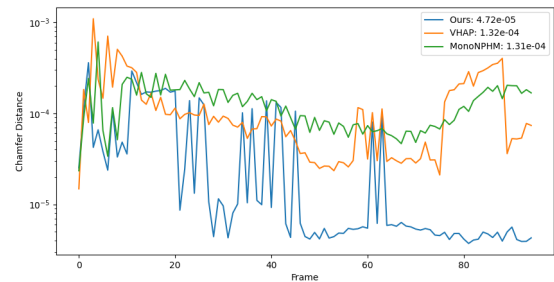


Figure 2. Chamfer distance for each frame on the synthetic dataset.



Figure 3. Qualitative results on the synthetic dataset.

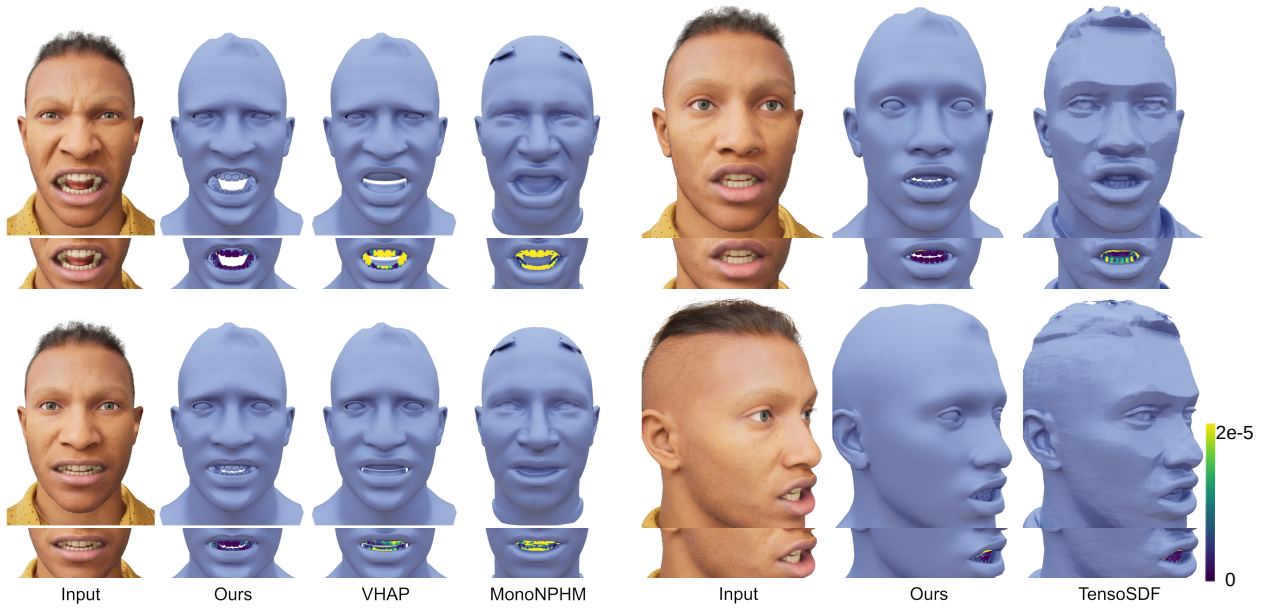


Figure 4. Quantitative comparison on the synthetic dataset. For each comparison, the top row shows the results while the bottom row visualizes the depth error.