

Supplementary Material 1

Supplementary Table 1. Summary of datasets, annotation types, and training set compositions across fusion strategies.

Dataset	Task(s)	Dataset Split (Train / Val / Test)	Original Image Resolution	Annotations	Fusion strategy	Fusion applied training dataset composition		Original Dataset split note	Fusion Specific Notes
						Real Set	Synthetic set		
PANac [14,33]	Full-mouth segmentation	1,663 / 153	Around 1127×1991	Pixel-level full-mouth masks	Real-only	1663(Adult: 1500; Child:163)	0	Validation and test sets are from the 306 official test samples	
					Matched-distribution	1663(Adult: 1500; Child:163)	1663(Adult: 1500; Child:163)		
					Class-balancing	1663(Adult: 1500; Child:163)	1337 (Child:1337)		
					Synthetic-only	0	1663(Adult: 1500; Child:163)		
TDD [15]	Full-mouth segmentation	779 / 96 / 101	Pixel-level full-mouth masks		Real-only	779 (Normal: 528; Pericoronal:30; Periapical:153; Non-Odontogenic:68)	0	8:1:1 random stratified	
					Matched-distribution	779 (Normal: 528; Pericoronal:30; Periapical:153; Non-Odontogenic:68)	779 (Normal: 528; Pericoronal:30; Periapical:153; Non-Odontogenic:68)		
					Class-balancing	779 (Normal: 528; Pericoronal:30; Periapical:153; Non-Odontogenic:68)	1333 (Pericoronal:498; Periapical:375; Non-Odontogenic:460)		
					Synthetic-only	0	779 (Normal: 528; Pericoronal:30; Periapical:153; Non-Odontogenic:68)		
	Abnormality segmentation	251 / 65	Pixel-level abnormality masks		Real-only- Unfiltered	251 (Pericoronal:30; Periapical:153; Non-Odontogenic:68)	0	Validation and test sets combined to match MedSAM fine-tuning protocol	Unfiltered: Normal cases (with empty abnormality masks) were excluded. No additional filtering was applied, all remaining abnormal cases were retained regardless of lesion size. Filtered: Normal cases were excluded. Abnormality masks with less than 100 foreground pixels excluded.
					Real-only	98 (Pericoronal:3; Periapical:60; Non-Odontogenic:35)	0		
					Matched-distribution	98 (Pericoronal:3; Periapical:60; Non-Odontogenic:35)	98 (Pericoronal:3; Periapical:60; Non-Odontogenic:35)		
					Class-balancing	98 (Pericoronal:3; Periapical:60; Non-Odontogenic:35)	82 (Pericoronal:57; Non-Odontogenic:25)		
					Synthetic-only	0	98 (Pericoronal:3; Periapical:60; Non-Odontogenic:35)		
Dentex [16]	Multi-label disease classification	705 / 50 / 250	Around 1504×2884	Image-level multi-label diagnoses	Real-only	705 (Impacted:254; Caries:623; Periapical Lesion:116; Deep Caries:321)	0	Predefined split	Multi-label case counts: number of PRs containing each disease label (individual labels may co-occur in the same image)
					Matched-distribution	705 (Impacted:254; Caries:623; Periapical Lesion:116; Deep Caries:321)	705 (Impacted:254; Caries:623; Periapical Lesion:116; Deep Caries:321)		
					Class-balancing	705 (Impacted:254; Caries:623; Periapical Lesion:116; Deep Caries:321)	820 (Impacted:250; Periapical Lesion:210; Deep Caries:270)		
					Minimal-balanced	705 (Impacted:254; Caries:623; Periapical Lesion:116; Deep Caries:321)	160 (Impacted:45; Caries:30; Periapical Lesion:160; Deep Caries:40)		
					Synthetic-only	0	705 (Impacted:254; Caries:623; Periapical Lesion:116; Deep Caries:321)		