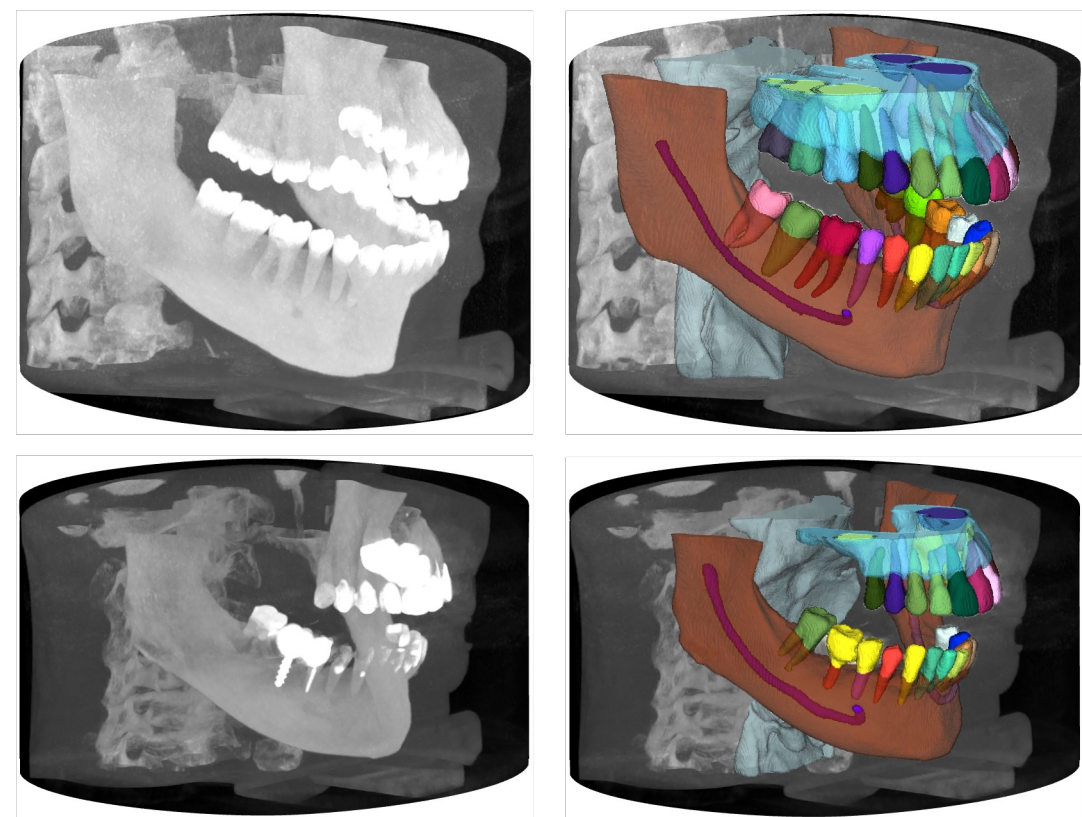
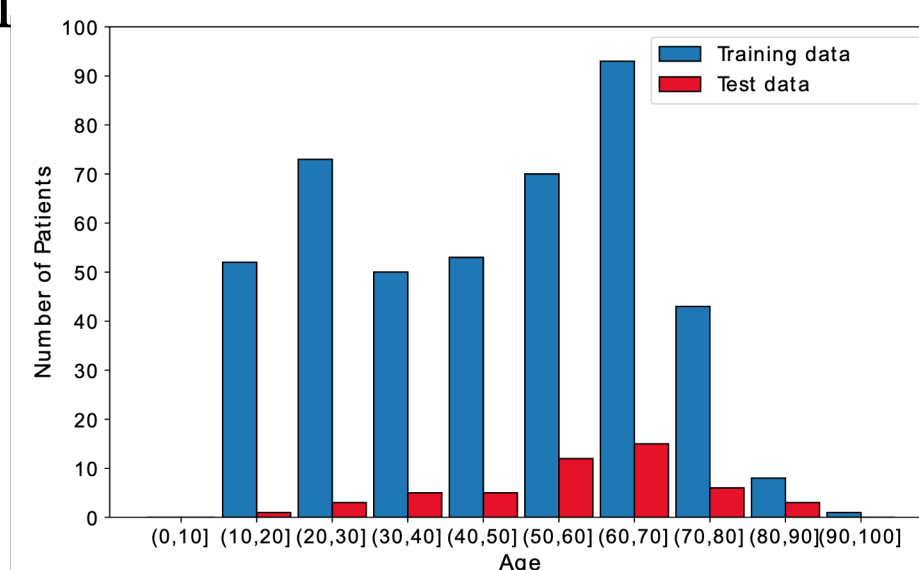


The ToothFairy2 Dataset



- 530 fully-annotated 3D CBCT volumes, acquired using two different scanners;
- A live leaderboard on grand-challenge for the evaluation of new models on 50 hidden test cases;
- Annotations clinically validated by 7 experts;
- Up to 42 classes per case are available.

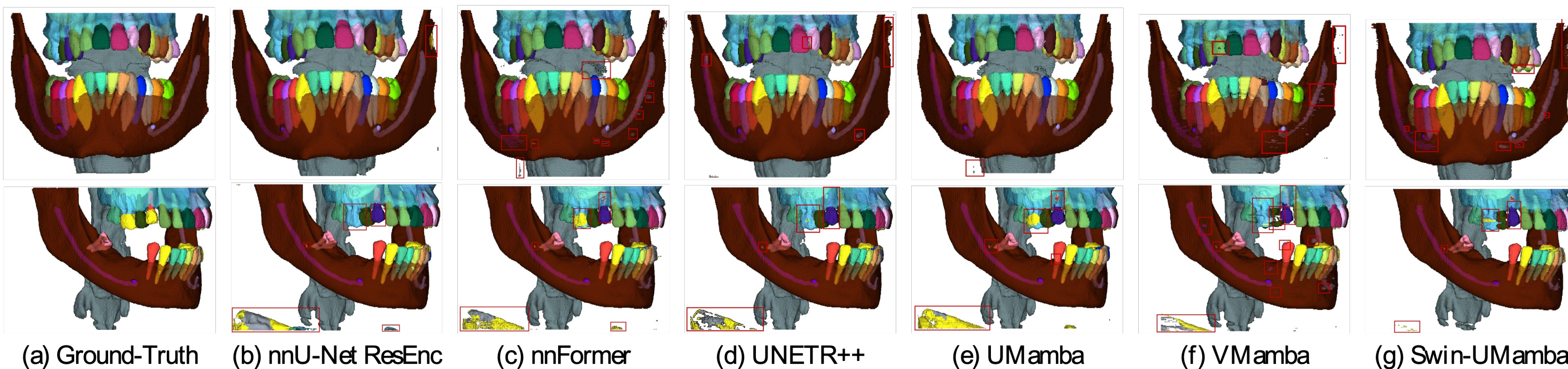


Segmentation Baselines

- 2D-based Mamba variants perform well, even if they lack 3D spatial reasoning;
- Both Transformer and 2D-based Mamba models generates noisy predictions when segmenting fine-grained structures;
- Models benefit from custom planning (e.g., disabling left/right mirroring).

nnU-Net ResEnc	DSC	HD95
Default	74.16	14.48
w/o l/r mirroring	80.79	12.37
w/o l/r mirroring, increased depth	82.11	11.86
w/o l/r mirroring, increased depth, post-processing	84.99	8.57

Model		Average		L/R IAC		L/R Sinus		Teeth		Jawbones		Pharynx		Others	
		DSC	HD95	DSC	HD95	DSC	HD95	DSC	HD95	DSC	HD95	DSC	HD95	DSC	HD95
GNNs	nnU-Net	70.92	17.86	71.34	29.11	64.81	28.39	73.17	18.32	90.31	12.53	95.66	19.23	29.50	20.95
	nnU-Net ResEnc (b)	74.16	14.48	73.01	27.81	65.71	29.99	76.48	14.26	91.77	12.53	<u>95.26</u>	<u>17.75</u>	<u>37.10</u>	16.32
Transf.	TransU-Net	70.32	20.17	81.96	11.99	59.69	59.76	72.46	15.04	90.33	49.02	87.89	42.87	27.68	22.65
	nnFormer (c)	76.79	5.45	72.28	10.06	75.11	8.22	79.37	2.94	91.50	20.09	90.85	24.53	18.95	13.67
	UNETR++ (d)	71.43	17.23	68.87	15.10	74.51	15.48	73.70	17.91	<u>92.38</u>	<u>5.44</u>	91.60	18.96	26.21	19.70
Mamba	UMamba (e)	85.05	5.28	85.26	16.23	<u>77.02</u>	<u>4.35</u>	86.58	2.23	90.05	22.17	92.18	25.25	43.89	<u>13.97</u>
	VMamba (f)	73.13	5.17	60.62	9.94	<u>73.20</u>	9.89	75.99	3.39	90.75	7.17	88.23	23.95	14.86	14.63
	Swin-UMamba (g)	79.64	2.94	72.64	2.02	87.75	2.38	80.71	2.59	94.29	4.25	93.05	2.79	25.30	14.93



Oral and Dental Image aNalysis - ODIN2025 Workshop and Challenges

- 1st International Workshop on Multi-Structure and Multi-Modal Learning for 3D Dental Image Analysis;
- 3rd edition of the ToothFairy challenge will focus on computational efficiency and interactive segmentations.



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

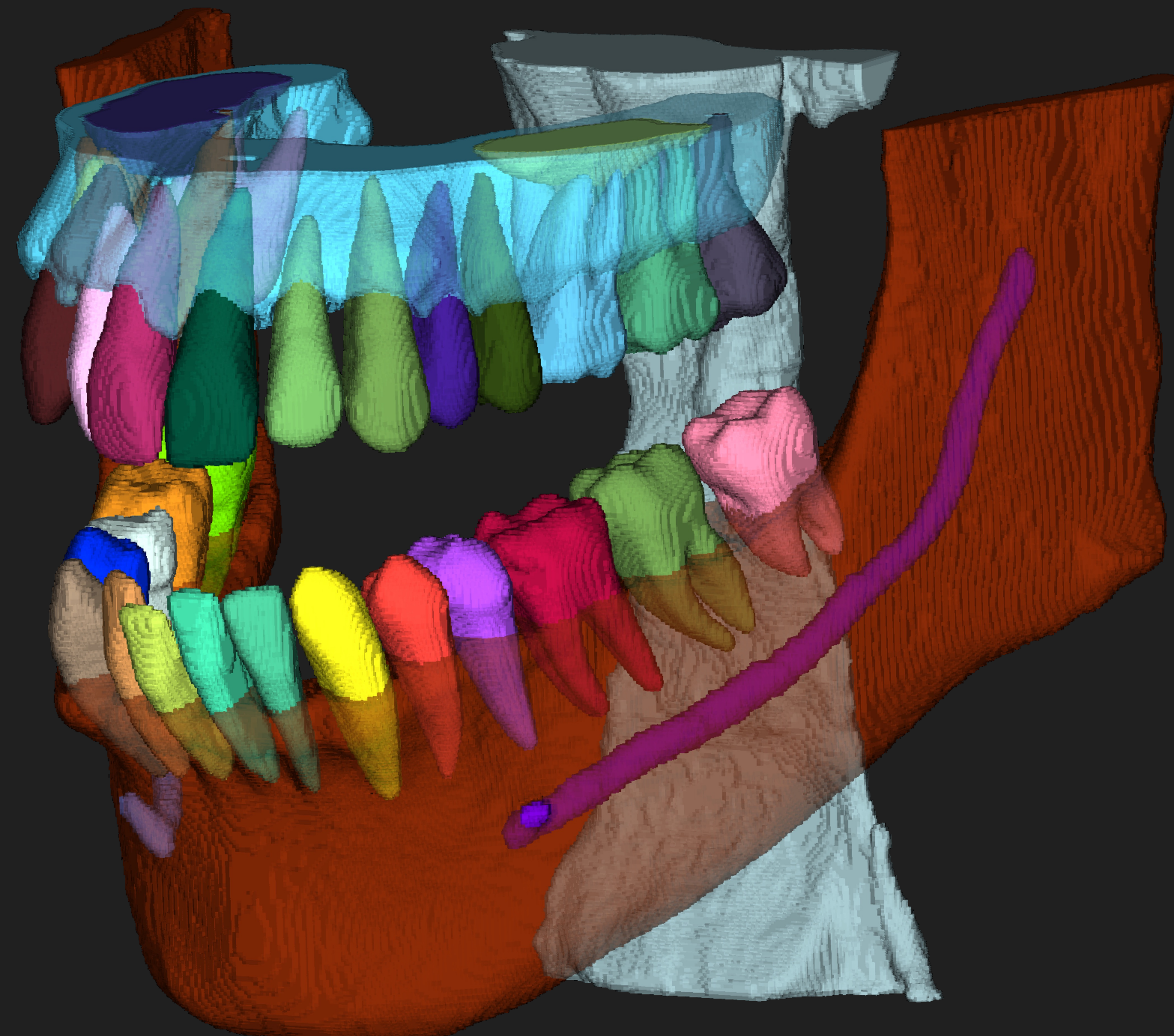


Radboudumc
university medical center



42 LABELED CLASSES

- Mandible
- Maxilla
- IAC Left
- IAC Right
- Sinus L.
- Sinus R.
- Pharynx
- Bridge
- Crown
- Implant
- Upper Incisors R.
- Upper Canine R.
- Upper Premolars R.
- Upper Molars R.
- Upper Incisors L.
- Upper Canine L.
- Upper Premolars L.
- Upper Molars L.
- Lower Incisors R.
- Lower Canine R.
- Lower Premolars R.
- Lower Molars R.
- Lower Incisors L.
- Lower Canine L.
- Lower Premolars L.
- Lower Molars L.



WANT TO
KNOW MORE?



Segmenting Maxillofacial Structures in CBCT Volumes

Federico Bolelli^{1*}, Kevin Marchesini^{1*}, Niels van Nistelrooij², Luca Lumetti¹,
Vittorio Pipoli¹, Elisa Ficarra¹, Shankeeth Vinayahalingam², Costantino Grana¹

¹University of Modena and Reggio Emilia, Italy

²Radboud University Medical Center, the Netherlands

* Equal Contribution