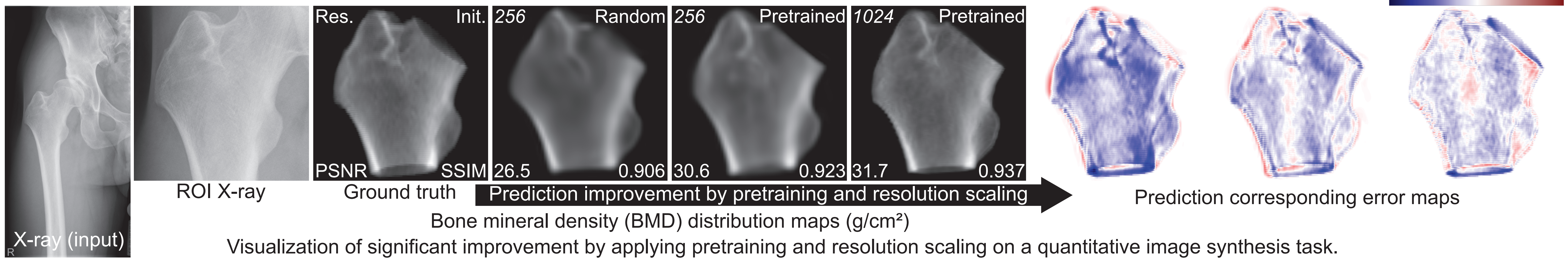


Enhancing Quantitative Image Synthesis through Pretraining and Resolution Scaling for Bone Mineral Density Estimation from a Plain X-Ray Image

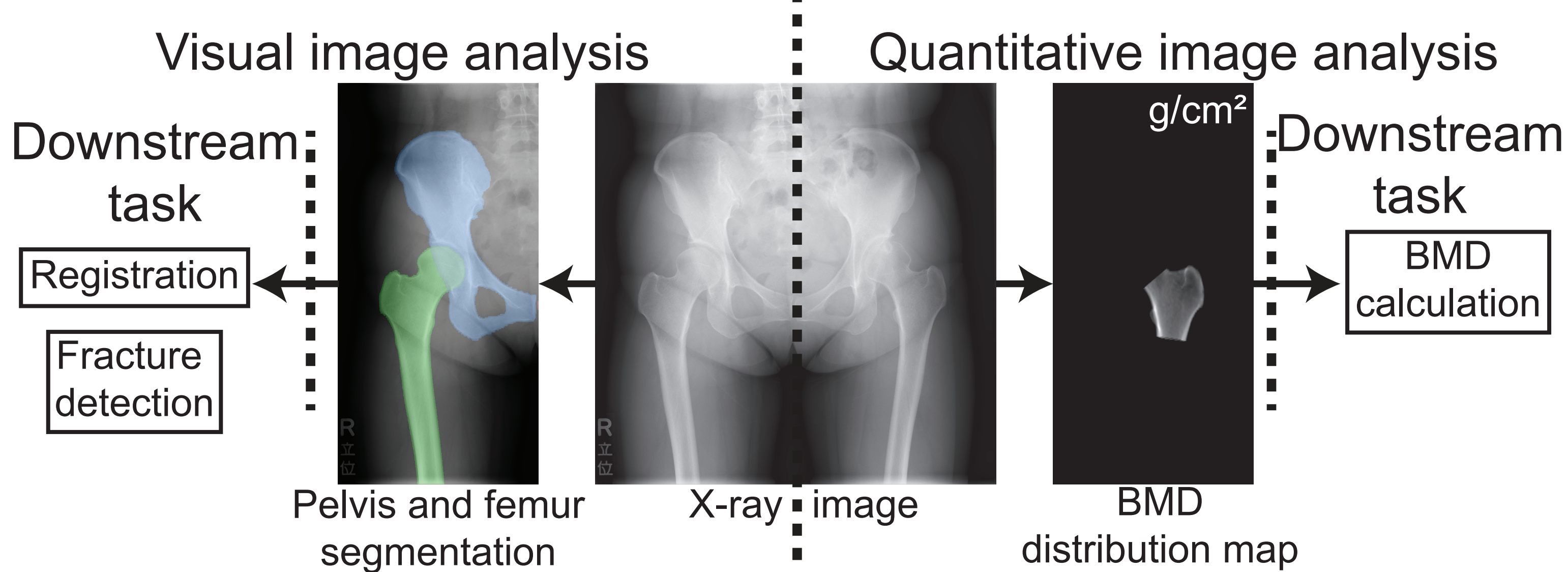
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Introduction

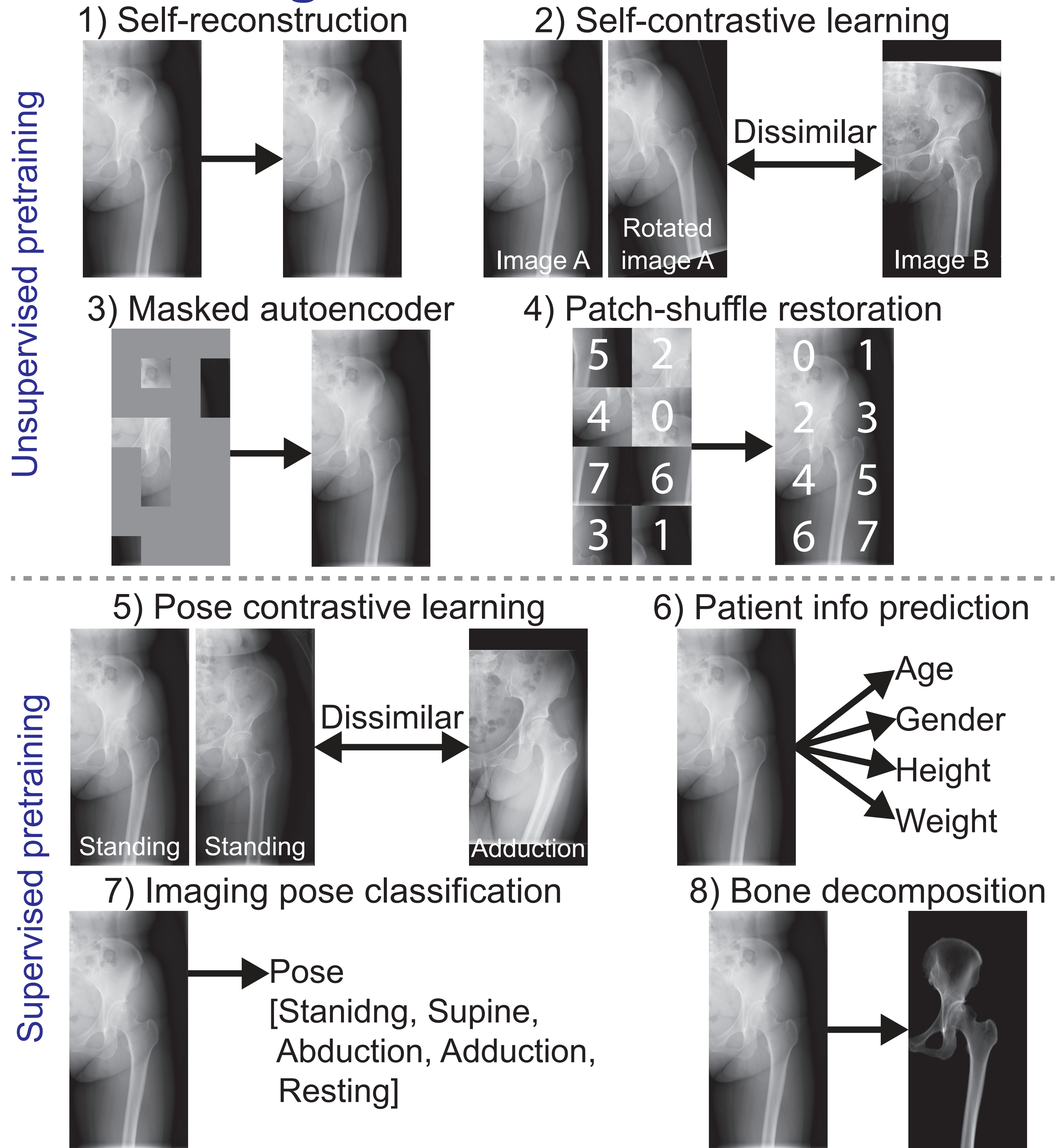
Quantitative image analysis is **important in medical field**.
Pretraining and resolution scaling has **been barely explored** for **Quantitative image synthesis**.



Contributions:

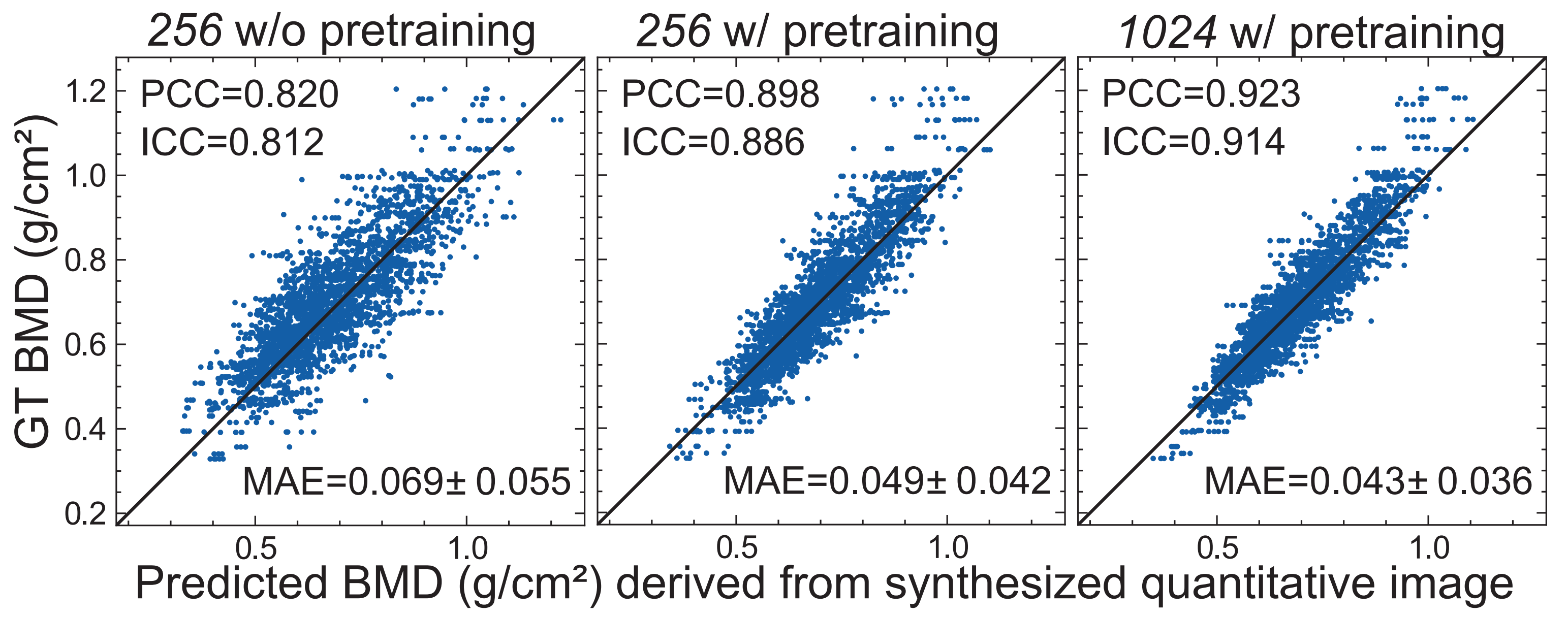
- Development of a **pretraining zoo of 10 techniques** over a large X-ray image database.
- **Significant improvement** by applying suitable pretraining and resolution scaling on a **large-scale** (2656 X-rays) dataset.

Pretraining zoo



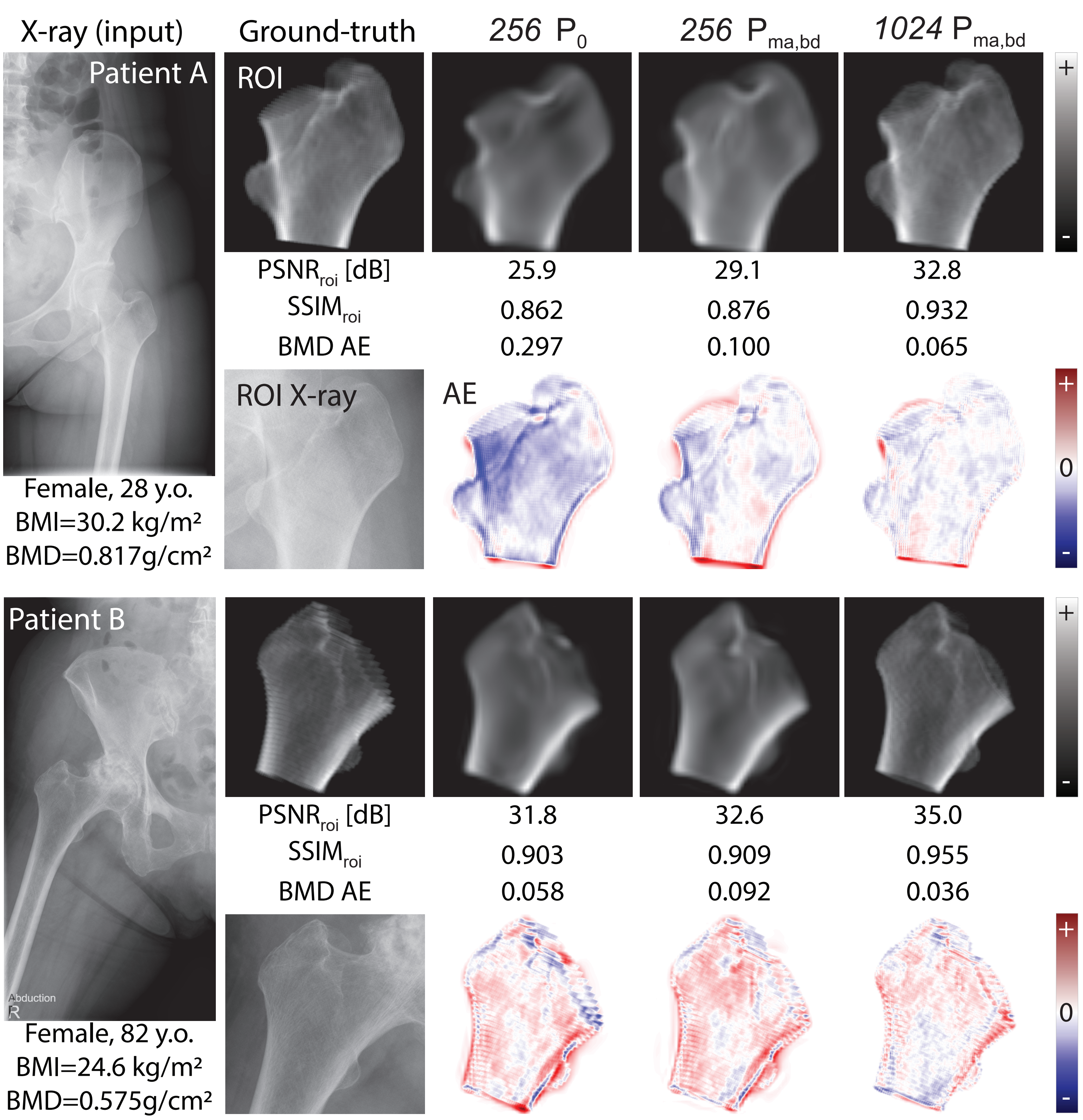
Results

Quantitative evaluation



Method	BMD evaluation			Image evaluation		
	PCC	ICC	MAE	PSNR	PSNR _{roi}	SSIM _{roi}
256 P ₀	0.820	0.812	0.069	39.9	28.6	0.887
256 P _{ma}	0.869	0.864	0.056	40.7	29.4	0.894
256 P _{bd}	0.886	0.876	0.053	40.9	29.6	0.897
256 P _{ma,bd}	0.898	0.886	0.049	41.3	29.9	0.898
512 P _{ma,bd}	0.917	0.909	0.044	42.3	30.9	0.925
1024 P _{ma,bd}	0.923	0.914	0.043	42.3	31.0	0.928

Qualitative evaluation



- We investigated the **effect of pretraining and resolution scaling** on quantitative image synthesis.
- We found that **suitable pretraining improves the performance** (while some may degrade it).
- Simple **resolution scaling-up gives effective and significant boost** on the performance.
- The future works include **generalization** to other quantitative image synthesis tasks.

Conclusion

