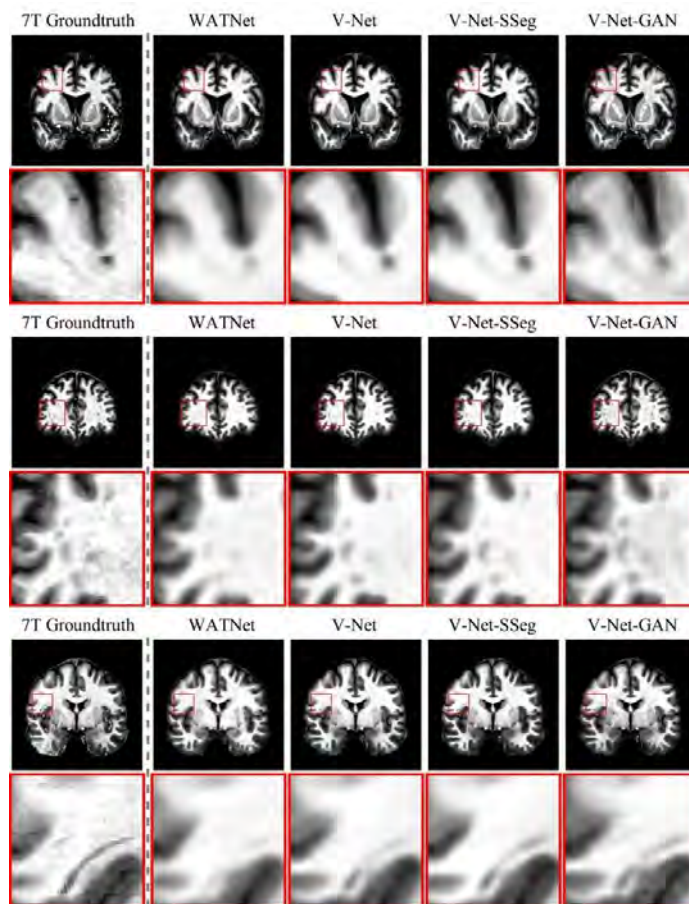**Table S1.** Leave-One-Out cross validation performance metrics across synthetic 7T models.

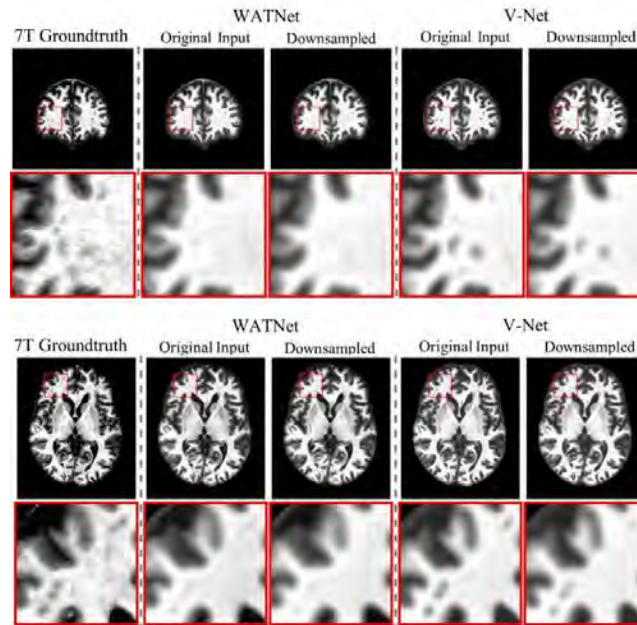| Task	WATNet	V-Net	V-Net-SSeg	V-Net-GAN
SSIM	0.881±0.008	0.914±0.016	0.908±0.013	0.899±0.012
PSNR	23.6±0.37	25.60±0.77	25.51±0.74	24.33±0.93
DICE	0.848±0.016	0.899±0.015	0.902±0.011	0.886±0.018

Fig. S1. Qualitative comparison of synthetic 7T images across three subjects with mild TBI. Every row corresponds to a unique subject.

Table S2. 6-fold cross validation results for WATNet trained with data augmentation.

Task	WATNet SSIM	WATNet PSNR	WATNet DICE
Original resolution	*0.877±0.010*	*24.97±0.34*	*0.869±0.006*
Downsampled (s=2)	*0.867±0.008*	*24.57±0.37*	*0.862±0.011*

Table S3. 6-fold cross validation results for V-Net trained with data augmentation.

Task	V-Net SSIM	V-Net PSNR	V-Net DICE
Original resolution	*0.880±0.013*	*24.97±0.30*	*0.873±0.010*
Downsampled (s=2)	*0.867±0.012*	*24.63±0.33*	*0.863±0.009*

Fig. S2. Comparison of synthetic 7T images generated from original and downsampled input MRIs. Every row corresponds to a unique subject. Input image resolution is downsampled by a factor of 2 in the downsampled scenario.