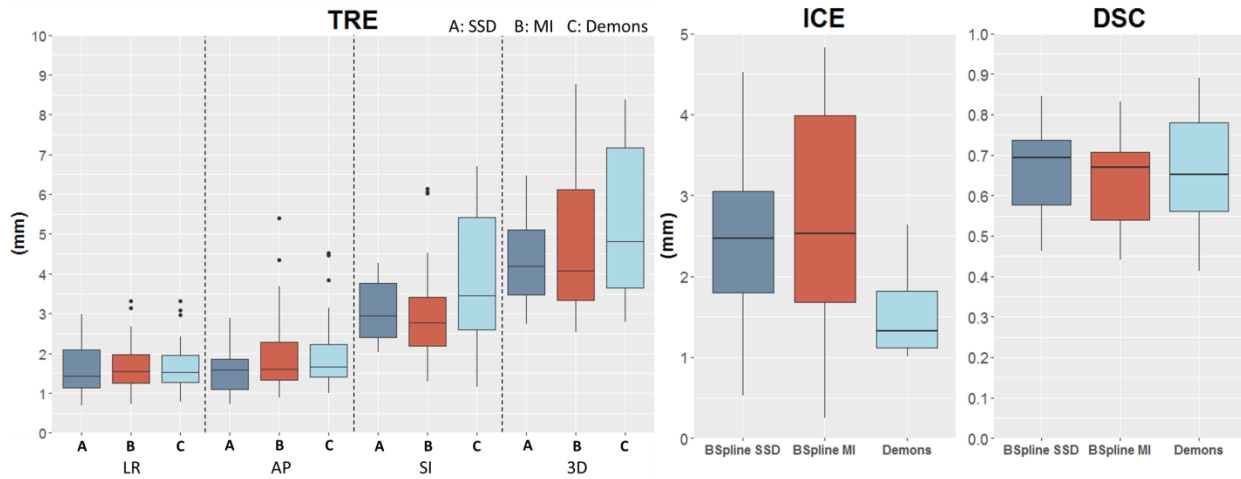# Supplemental

Supplemental Table 1. TRE, ICE and DSC for each registration. (Mean±Standard Deviation)

Registration	TRE (mm)				ICE (mm)	DSC
	LR	AP	SI	3D		
BSpline SSD	1.63±0.68	1.59±0.56	3.05±0.79	4.30±1.09	2.77±1.33	0.66±0.11
BSpline MI	1.71±0.69	2.05±1.19	3.20±1.44	4.75±1.88	3.04±1.95	0.65±0.12
Demons	1.71±0.72	2.08±1.08	3.82±1.62	5.28±1.94	1.48±0.49	0.65±0.13

Supplemental Figure 1. Box plots of TRE, ICE and DSC for each registration method.

Supplemental Table 2. Spearman correlation and average percentage difference between tumor volume change calculated by Jacobian integral and manual segmentation.

| Registration	Spearman Correlation ρ	Percentage difference
BSpline SSD	0.63	24%
BSpline MI	0.61	24%
Demons	0.69	27%

Supplemental Table 3. The intra-class correlation coefficient (ICC) among the eroded/dilated contours and the original contours.

| Feature	ICC	P-value
Median Jacobian	0.98	1.0E-29
Minimum Jacobian	0.95	2.0E-22

Supplemental Table 4. Comparison between the predictions by the SVM-LASSO model using Jacobian features from the original contour and 2 mm dilated/eroded contours.

Contour	Sensitivity (%)	Specificity (%)	Accuracy (%)	AUC
Original	94.4%	91.8%	94.0%	0.94
Dilated	100%	90.9%	95.0%	0.93
Eroded	88.8%	90.9%	90.0%	0.92
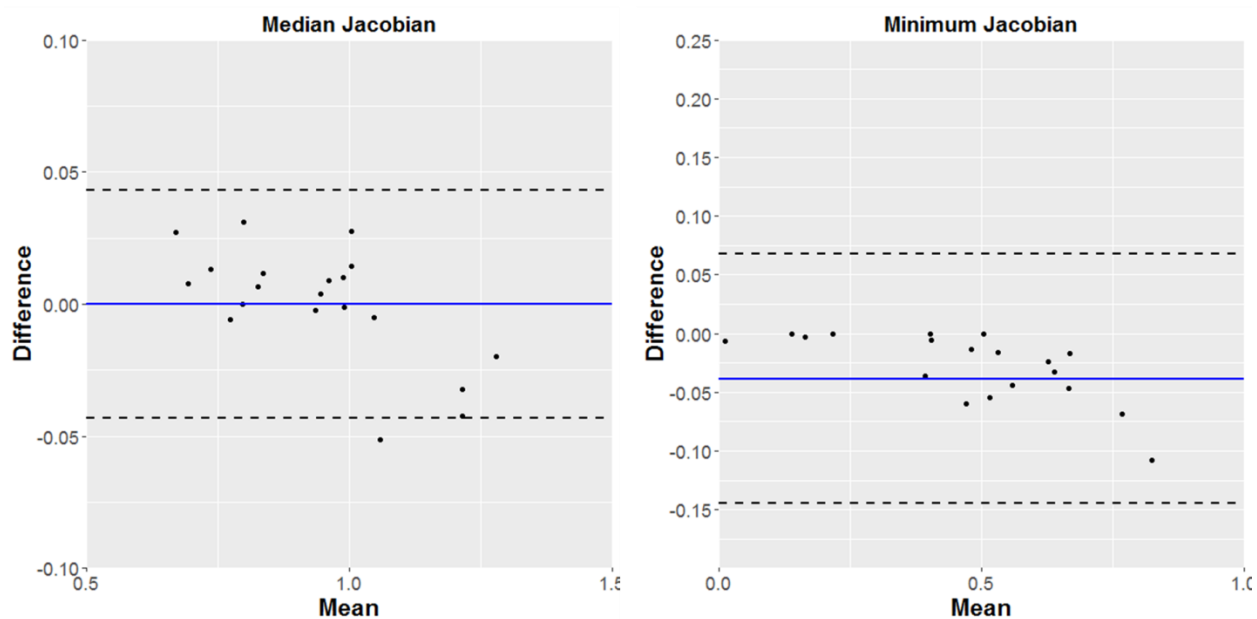
Dilated Contour
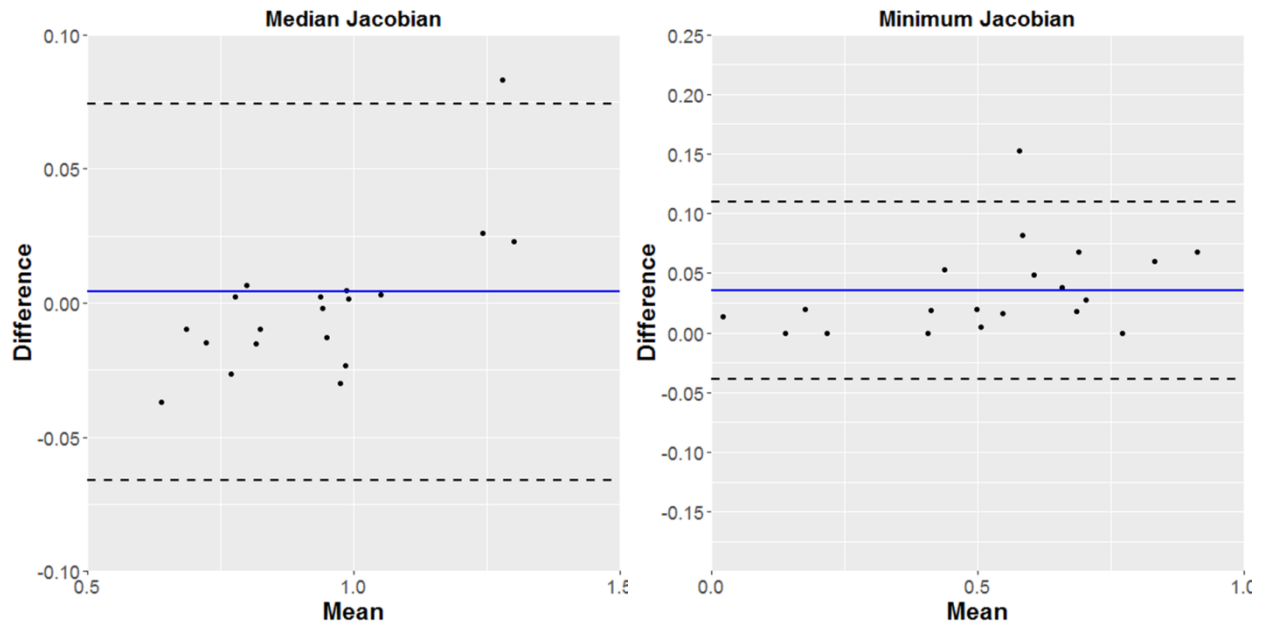
Supplemental Figure 2. Bland-Altman plots for the two selected features between the original contour and the dilated/eroded contours; Blue line is average difference and dashed lines are 95% limits of agreement.

Supplemental Table 5. List of radiomic features extracted from baseline and follow-up PET/CT, their changes and Jacobian map. GLCM=Gray Level Co-occurrence Matrix. GRLM=Gray Level Run Length Matrix. *2D was also extracted.

Feature Name	Feature Type	Texture Type	Images
Tumor Volume*	Shape		CT, PET, Jacobian
Bounding Box Volume	Shape		CT, PET, Jacobian
Bounding Box Size1	Shape		CT, PET, Jacobian
Bounding Box Size2	Shape		CT, PET, Jacobian
Bounding Box Size 3	Shape		CT, PET, Jacobian
Oriented Bounding Box Volume	Shape		CT, PET, Jacobian
Oriented Bounding Box Size 1	Shape		CT, PET, Jacobian
Oriented Bounding Box Size 2	Shape		CT, PET, Jacobian
Oriented Bounding Box Size 3	Shape		CT, PET, Jacobian
Equivalent Ellipsoid Diameter 1*	Shape		CT, PET, Jacobian
Equivalent Ellipsoid Diameter 2*	Shape		CT, PET, Jacobian
Equivalent Ellipsoid Diameter 3	Shape		CT, PET, Jacobian
Equivalent Spherical Perimeter*	Shape		CT, PET, Jacobian
Equivalent Spherical Radius*	Shape		CT, PET, Jacobian
Feret Diameter*	Shape		CT, PET, Jacobian
Number Of Lines*	Shape		CT, PET, Jacobian
Number Of Pixels*	Shape		CT, PET, Jacobian
Perimeter*	Shape		CT, PET, Jacobian
Eccentricity	Shape		CT, PET, Jacobian
Elongation*	Shape		CT, PET, Jacobian
Flatness*	Shape		CT, PET, Jacobian
Orientation	Shape		CT, PET, Jacobian
Roundness*	Shape		CT, PET, Jacobian
Weighted Elongation*	Shape-Intensity		CT, PET, Jacobian
Weighted Flatness*	Shape-Intensity		CT, PET, Jacobian
Median*	Intensity		CT, PET, Jacobian
Minimum*	Intensity		CT, PET, Jacobian
Kurtosis*	Intensity		CT, PET, Jacobian
Maximum*	Intensity		CT, PET, Jacobian
Mean*	Intensity		CT, PET, Jacobian
Skewness*	Intensity		CT, PET, Jacobian
Standard Deviation*	Intensity		CT, PET, Jacobian
Sum*	Intensity		CT, PET, Jacobian
Variance*	Intensity		CT, PET, Jacobian
Mean Of Energy	Texture	GLCM	CT, PET, Jacobian

Mean Of Entropy	Texture	GLCM	CT, PET, Jacobian
Mean Of Correlation	Texture	GLCM	CT, PET, Jacobian
Mean Of Inverse Difference Moment	Texture	GLCM	CT, PET, Jacobian
Mean Of Inertia	Texture	GLCM	CT, PET, Jacobian
Mean Of Cluster Shade	Texture	GLCM	CT, PET, Jacobian
Mean Of Cluster Prominence	Texture	GLCM	CT, PET, Jacobian
Mean Of Haralick Correlation	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Energy	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Entropy	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Correlation	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Inverse Difference Moment	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Inertia	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Cluster Shade	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Cluster Prominence	Texture	GLCM	CT, PET, Jacobian
Standard Deviation Of Haralick Correlation	Texture	GLCM	CT, PET, Jacobian
Mean Of Short Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of Long Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of Grey Level Non-uniformity	Texture	GLRM	CT, PET, Jacobian
Mean Of Run Length Non-uniformity	Texture	GLRM	CT, PET, Jacobian
Mean Of Low Grey Level Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of High Grey Level Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of Short Run Low Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of Short Run High Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of Long Run Low Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Mean Of Long Run High Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Short Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Long Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Grey Level Non-uniformity	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Run Length Non-uniformity	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Low Grey Level Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of High Grey Level Run Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Short Run Low Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Short Run High Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Long Run Low Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Standard Deviation Of Long Run High Grey Level Emphasis	Texture	GLRM	CT, PET, Jacobian
Total Lesion Glycolysis	Metabolic		PET
Jacobian Integral	Jacobian		Jacobian
Shrinking Percentage	Jacobian		Jacobian
Expansion Percentage	Jacobian		Jacobian