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Appendix

Appendix Tables A1-A5

Table A1. 6-point Dixon Magnetic Resonance Imaging Parameters

Parameter	CO T1	CO PDfs	Axial PDfs	SO T1	Axial 2PD	SO 2PD
TR (ms)	573	2800.0	2800.0	531.0	4.32	4.32
TE (ms)	9.6	38.0	37.0	11.0	1.35, 2.58	1.35, 2.58
Thickness (mm)	3	3	3	3	2	2
Flip angle (°)	150	150	150	140	9	9
Matrix (pixel)	256 × 320	256 × 320	256 × 320	288 × 384	288 × 320	227 × 320
FOV (mm)	160 × 160	160 × 160	180 × 180	160 × 160	346 × 346	346 × 346
TA (min: s)	1:05	1:07	0:56	1:06	2:36	2:35

CO, coronal oblique; SO, sagittal oblique; 2PD, two-point Dixon; FOV, field of view; PDfs, proton density weighted with fat saturation; TA, acquisition time; TE, echo time; TR, repetition time.

Table A2. Comparisons of the three-dimensional (3D) fatty infiltration between the overall supraspinatus (Overall-FI) and the segmented sectional accumulation units (SAU-FIs) at different stages of stepwise segmentation and piecewise accumulation

Stage I	Overall-FI [†]											
All patients	15.54 (13.92-17.17)											
S-to-M Tear	13.32(10.12-16.53)											
Large Tear	14.02(12.09-15.94)											
Massive Tear	20.16(17.30-23.03)											
Stage II (N/3 SAU)	1/3 SAU-FI [†]	2/3 SAU-FI [†]	3/3 SAU-FI [†]									
All patients	15.55(13.92-17.19)	15.68(13.86-17.49)	16.13(14.47-17.78)									
S-to-M Tear	13.32(9.92-16.72)	12.60(9.50-15.69)	14.70(10.93-18.47)									
Large Tear	15.17(12.37-17.97)	15.75(11.80-19.70)	16.04(12.23-19.85)									
Massive Tear	20.64(16.98-24.30)	23.14(17.68-28.60)	22.66(17.76-27.56)									
Stage III (N/6 SAU)	1/6 SAU-FI [†]	2/6 SAU-FI [†]	3/6 SAU-FI [†]	4/6 SAU-FI [†]	5/6 SAU-FI [†]	6/6 SAU-FI [†]						
All patients	16.63(13.43-16.70)	15.07 (13.43-16.70)	15.14(13.27-17.02)	16.12(14.30-17.93)	16.10 (14.47-17.73)	15.05(13.57-16.53)						
S-to-M Tear	13.32(10.61-18.52)	14.57(9.61-15.87)	12.74(9.28-15.20)	12.24(9.70-16.34)	13.02(10.78-18.31)	14.54(11.14-18.73)						
Large Tear	15.38(13.04-17.72)	13.61(11.54-15.68)	13.29(11.11-15.47)	14.72(12.56-16.88)	14.92(12.94-16.90)	13.59(12.00-15.18)						
Massive Tear	20.68(17.04-24.32)	19.69(16.94-22.44)	20.96(17.22-24.70)	21.49(18.28-24.71)	19.50(16.53-22.47)	17.31(14.51-20.11)						
Stage IV (N/12 SAU)	1/12 SAU-FI [†]	2/12 SAU-FI [†]	3/12 SAU-FI [†]	4/12 SAU-FI [†]	5/12 SAU-FI [†]	6/12 SAU-FI [†]	7/12 SAU-FI [†]	8/12 SAU-FI [†]	9/12 SAU-FI [†]	10/12 SAU-FI [†]	11/12 SAU-FI [†]	12/12 SAU-FI [†]
All patients	17.20(15.23-19.17)	16.30(14.38-18.22)	15.43(13.79-17.06)	14.80(13.12-16.49)	14.80(12.97-16.64)	15.42(13.47-17.36)	16.06(14.16-17.96)	16.24(14.42-18.05)	16.06(14.43-17.70)	16.06(14.39-17.72)	15.64(14.08-17.20)	14.02(12.59-15.46)*
S-to-M Tear	16.04(12.23-19.84)	13.96(9.83-18.09)	13.42(10.17-16.67)	12.33(9.21-15.45)	12.02(9.16-14.87)	12.39(9.32-15.45)	12.82(9.39-16.24)	13.18(9.86-16.51)	14.25(10.64-17.86)	14.84(10.81-18.86)	15.71(11.83-19.60)	13.59(9.93-17.24)
Large Tear	16.17(13.27-19.07)	14.86(12.65-17.08)	13.95(11.74-16.15)	13.31(11.22-15.41)	13.21(11.00-15.42)	13.38(11.14-15.63)	14.31(12.11-16.50)	15.33(12.97-17.70)	15.15(13.04-17.26)	14.58(12.68-16.48)	13.89(12.17-15.61)	13.11(11.53-14.70)
Massive Tear	20.16(15.57-24.33)	19.95(17.28-24.57)	20.92(17.07-22.43)	19.75(16.62-22.67)	19.64(16.25-24.01)	20.13(17.92-25.39)	21.66(18.94-25.28)*	22.11(17.40-24.30)	20.85(16.28-22.42)	19.35(16.55-22.50)	19.53(15.16-21.06)	18.11(12.93-18.73)*

S-to-M, Small-to-Medium.
The values are given as the mean and 95% CI in parentheses. [†]P < 0.05 indicates significance.
*P < 0.05 between overall SAU-FI and segmented SAU SAU-FIs

Table A3. Correlations of the three-dimensional (3D) fatty infiltration between the overall supraspinatus (Overall-FI) and the segmented sectional accumulation units (SAU-FIs) at different stages of stepwise segmentation and piecewise accumulation

	All patients				Small-to-Medium tear				Large tear				Massive tear			
	Pearson r [†]	P-value [‡]	Spearman ρ [†]	P-value [‡]	Pearson r [†]	P-value [‡]	Spearman ρ [†]	P-value [‡]	Pearson r [†]	P-value [‡]	Spearman ρ [†]	P-value [‡]	Pearson r [†]	P-value [‡]	Spearman ρ [†]	P-value [‡]
Stage II (N/3 SAU)																
1/3 SAU	0.93(0.87-0.96)	<0.001	0.91(0.84-0.95)	<0.001	0.96(0.87-0.99)	<0.001	0.95(0.85-0.99)	<0.001	0.84(0.63-0.94)	<0.001	0.84(0.60-0.94)	<0.001	0.86(0.58-0.96)	<0.001	0.66(0.16-0.89)	0.016
2/3 SAU	0.98(0.96-0.99)	<0.001	0.98(0.96-0.99)	<0.001	0.98(0.94-0.99)	<0.001	0.97(0.91-0.99)	<0.001	0.97(0.92-0.99)	<0.001	0.96(0.89-0.99)	<0.001	0.97(0.90-0.99)	<0.001	0.96(0.87-0.99)	<0.001
3/3 SAU	0.96(0.93-0.98)	<0.001	0.96(0.93-0.98)	<0.001	0.96(0.86-0.99)	<0.001	0.97(0.91-0.99)	<0.001	0.93(0.83-0.97)	<0.001	0.92(0.78-0.97)	<0.001	0.99(0.97-1.00)	<0.001	0.99(0.98-1.0)	<0.001
Stage III (N/6 SAU)																
1/6 SAU	0.78(0.63-0.87)	<0.001	0.76(0.60-0.86)	<0.001	0.91(0.74-0.97)	<0.001	0.93(0.78-0.98)	<0.001	0.60(0.21-0.83)	<0.001	0.61(0.21-0.84)	0.005	0.58(0.04-0.86)	.039	0.41(-0.20-0.79)	0.001
2/6 SAU	0.95(0.91-0.97)	<0.001	0.94(0.88-0.96)	<0.001	0.97(0.89-0.99)	<0.001	0.95(0.85-0.99)	<0.001	0.88(0.71-0.95)	<0.001	0.85(0.63-0.94)	<0.001	0.94(0.80-0.98)	<0.001	0.93(0.78-0.98)	<0.001
3/6 SAU	0.97(0.94-0.98)	<0.001	0.97(0.95-0.98)	<0.001	0.97(0.90-0.99)	<0.001	0.96(0.89-0.99)	<0.001	0.97(0.91-0.99)	<0.001	0.95(0.87-0.98)	<0.001	0.95(0.85-0.99)	<0.001	0.98(0.92-0.99)	<0.001
4/6 SAU	0.97(0.94-0.98)	<0.001	0.97(0.94-0.98)	<0.001	0.98(0.93-0.99)	<0.001	0.96(0.86-0.99)	<0.001	0.94(0.84-0.98)	<0.001	0.93(0.82-0.97)	<0.001	0.96(0.86-0.99)	<0.001	0.91(0.70-0.97)	<0.001
5/6 SAU	0.93(0.87-0.96)	<0.001	0.94(0.90-0.97)	<0.001	0.94(0.81-0.98)	<0.001	0.96(0.87-0.99)	<0.001	0.93(0.82-0.97)	<0.001	0.88(0.70-0.95)	<0.001	0.89(0.67-0.97)	<0.001	0.89(0.66-0.97)	<0.001
6/6 SAU	0.85(0.75-0.92)	<0.001	0.89(0.81-0.94)	<0.001	0.95(0.86-0.99)	<0.001	0.95(0.85-0.99)	<0.001	0.83(0.60-0.93)	<0.001	0.81(0.54-0.92)	<0.001	0.83(0.51-0.95)	<0.001	0.94(0.80-0.98)	<0.001
Stage IV (N/12 SAU)																
1/12 SAU	0.61(0.39-0.77)	<0.001	0.56(0.32-0.74)	<0.001	0.86(0.60-0.95)	<0.001	0.82(0.51-0.94)	0.001	0.48(0.03-0.77)	0.039	0.51(0.06-0.79)	0.025	0.38(-0.21-0.77)	0.196	0.26(-0.36-0.72)	0.394
2/12 SAU	0.82(0.70-0.90)	<0.001	0.81(0.68-0.90)	<0.001	0.91(0.74-0.97)	<0.001	0.93(0.78-0.98)	<0.001	0.67(0.32-0.86)	0.002	0.65(0.27-0.86)	0.003	0.64(0.13-0.88)	0.020	0.59(0.05-0.87)	0.036
3/12 SAU	0.82(0.70-0.90)	<0.001	0.81(0.68-0.90)	<0.001	0.91(0.74-0.97)	<0.001	0.93(0.78-0.98)	<0.001	0.67(0.32-0.86)	0.002	0.65(0.27-0.86)	<0.001	0.64(0.13-0.88)	0.020	0.59(0.05-0.87)	0.036
4/12 SAU	0.94(0.90-0.97)	<0.001	0.93(0.88-0.96)	<0.001	0.96(0.87-0.99)	<0.001	0.94(0.82-0.98)	<0.001	0.85(0.65-0.94)	<0.001	0.84(0.62-0.94)	<0.001	0.94(0.80-0.98)	<0.001	0.92(0.75-0.98)	<0.001
5/12 SAU	0.95(0.92-0.97)	<0.001	0.96(0.93-0.98)	<0.001	0.97(0.91-0.99)	<0.001	0.90(0.71-0.97)	<0.001	0.95(0.86-0.98)	<0.001	0.93(0.82-0.97)	<0.001	0.93(0.76-0.98)	<0.001	0.96(0.85-0.99)	<0.001
6/12 SAU	0.96(0.92-0.98)	<0.001	0.96(0.93-0.98)	<0.001	0.95(0.86-0.99)	<0.001	0.94(0.82-0.98)	<0.001	0.95(0.86-0.98)	<0.001	0.93(0.82-0.97)	<0.001	0.94(0.82-0.98)	<0.001	0.97(0.90-0.99)	<0.001
7/12 SAU	0.95(0.92-0.97)	<0.001	0.95(0.92-0.98)	<0.001	0.95(0.84-0.98)	<0.001	0.94(0.82-0.98)	<0.001	0.92(0.81-0.97)	<0.001	0.91(0.76-0.97)	<0.001	0.95(0.83-0.98)	<0.001	0.90(0.69-0.97)	<0.001
8/12 SAU	0.94(0.89-0.97)	<0.001	0.93(0.87-0.96)	<0.001	0.98(0.94-0.99)	<0.001	0.94(0.82-0.98)	<0.001	0.87(0.70-0.95)	<0.001	0.88(0.69-0.95)	<0.001	0.92(0.74-0.98)	<0.001	0.82(0.49-0.95)	<0.001
9/12 SAU	0.93(0.87-0.96)	<0.001	0.93(0.87-0.96)	<0.001	0.93(0.79-0.98)	<0.001	0.95(0.83-0.98)	<0.001	0.93(0.82-0.97)	<0.001	0.89(0.74-0.96)	<0.001	0.91(0.72-0.97)	<0.001	0.86(0.58-0.96)	<0.001
10/12 SAU	0.90(0.82-0.94)	<0.001	0.91(0.85-0.9)	<0.001	0.92(0.77-0.98)	<0.001	0.95(0.83-0.98)	<0.001	0.89(0.73-0.96)	<0.001	0.89(0.72-0.96)	<0.001	0.83(0.52-0.95)	<0.001	0.87(0.60-0.96)	<0.001
11/12 SAU	0.85(0.75-0.92)	<0.001	0.88(0.79-0.93)	<0.001	0.95(0.83-0.98)	<0.001	0.94(0.81-0.98)	<0.001	0.83(0.60-0.93)	<0.001	0.80(0.53-0.92)	<0.001	0.84(0.53-0.95)	<0.001	0.92(0.73-0.98)	<0.001
12/12 SAU	0.80(0.67-0.89)	<0.001	0.84(0.73-0.91)	<0.001	0.95(0.85-0.98)	<0.001	0.96(0.86-0.99)	<0.001	0.73(0.42-0.89)	<0.001	0.71(0.37-0.88)	<0.001	0.73(0.31-0.92)	<0.001	0.81(0.46-0.94)	<0.001

[†]The values are given as the mean and 95% CI in parentheses.

[‡]P < 0.05 indicates significance.

Table A4. Conversion factors and predictive performance of regression models between the overall supraspinatus (Overall-FI) and the segmented sectional accumulation units (SAU-FIs) at different stages of stepwise segmentation and piecewise accumulation

	All patients					Small-to-Medium tear					Large tear					Massive tear				
	Slope [†]	Intercept [†]	R - squar ed	RMS E	P- value [‡]	Slope [†]	Intercept [†]	R- squar ed	RMS E	P- value [‡]	Slope [†]	Intercept [†]	R - squar ed	RMS E	P- value [‡]	Slope [†]	Intercept [†]	R- squar ed	RMS E	P- value [‡]
Stage II (N/3 SAU)																				
1/3 SAU	0.92(0.81-1.00)	1.20(-0.67-3.10)	0.86	2.10	<0.001	0.90(0.74-1.10)	1.28(-1.1-3.71)	0.92	1.64	<0.001	0.82(0.55-1.10)	2.40(0.76-0.99)	0.71	2.20	<0.001	0.90(0.54-1.30)	2.20(-5.20-9.50)	0.74	2.54	<0.001
2/3 SAU	0.87(0.82-0.93)	1.80(0.88-2.80)	0.95	1.18	<0.001	1.02(0.89-1.10)	0.51(-1.2-2.22)	0.96	1.09	<0.001	0.88(-1.50-6.30)	1.70(-0.06-3.4)	0.94	1.03	<0.001	0.82(0.69-0.95)	2.80(-0.17-5.70)	0.94	1.18	<0.001
3/3 SAU	0.94(0.86-1.00)	0.35(-1.10-1.80)	0.92	1.55	<0.001	0.81(0.66-0.97)	1.36(-1.1-3.91)	0.91	1.69	<0.001	1.00(0.55-1.10)	-0.70(-1.50-6.3)	0.87	1.48	<0.001	0.93(0.84-1.01)	1.40(-0.42-3.20)	0.98	0.69	<0.001
Stage III (N/6 SAU)																				
1/6 SAU	0.68(0.51-0.85)	4.20(1.30-7.20)	0.61	3.47	<0.001	0.74(0.53-0.95)	2.50(-0.78-5.90)	0.83	2.35	<0.001	0.50(0.16-0.83)	6.40(0.99-12.00)	0.37	3.27	<0.001	0.45(0.03-0.88)	10.76(1.62-20.00)	0.33	4.04	<0.001
2/6 SAU	0.95(0.85-1.00)	1.30(-0.24-2.80)	0.90	1.73	<0.001	0.99(0.82-1.20)	0.71(-1.60-3.00)	0.93	1.51	<0.001	0.82(0.59-1.00)	2.90(-0.32-6.10)	0.77	1.96	<0.001	0.98(0.74-1.20)	0.89(-3.90-5.70)	0.88	1.71	<0.001
3/6 SAU	0.84(0.77-0.91)	2.90(1.70-4.00)	0.93	1.44	<0.001	1.00(0.87-1.20)	0.51(-1.80-2.80)	0.94	1.46	<0.001	0.85(0.74-0.97)	2.70(1.10-4.30)	0.94	1.05	<0.001	0.73(0.58-0.88)	4.85(1.50-8.20)	0.91	1.50	<0.001
4/6 SAU	0.87(0.80-0.94)	1.60(0.39-2.70)	0.94	1.37	<0.001	0.94(0.82-1.10)	1.00(-0.75-2.80)	0.96	1.20	<0.001	0.83(0.67-0.99)	1.80(-0.70-4.20)	0.88	1.44	<0.001	0.85(0.68-1.00)	1.82(-2.00-5.60)	0.92	1.43	<0.001
5/6 SAU	0.93(0.81-1.00)	0.64(-1.30-2.50)	0.86	2.05	<0.001	0.79(0.60-0.97)	2.00(-1.00-5.00)	0.89	1.88	<0.001	0.90(0.72-1.10)	0.56(-2.30-3.40)	0.86	1.54	<0.001	0.86(0.57-1.20)	3.36(-2.40-9.20)	0.80	2.24	<0.001
6/6 SAU	0.93(0.76-1.10)	1.50(-1.30-4.20)	0.73	2.89	<0.001	0.81(0.65-0.97)	1.30(-1.3-3.90)	0.91	1.74	<0.001	1.00(0.65-1.30)	0.44(-4.40-5.30)	0.68	2.31	<0.001	0.85(0.47-1.20)	5.50(-1.30-12.00)	0.69	2.78	<0.001
Stage IV (N/12 SAU)																				
1/12 SAU	0.51(0.31-0.70)	6.85(3.20-10.49)	0.38	4.37	<0.001	0.72(0.45-1.00)	1.76(-2.96-6.48)	0.73	2.99	<0.001	0.32(0.02-0.62)	8.90(3.76-14.0)	0.23	3.61	<0.001	0.25(-0.15-0.65)	15.16(6.68-23.60)	0.15	4.58	0.196
2/12 SAU	0.70(0.55-0.84)	4.20(1.60-6.78)	0.67	3.17	<0.001	0.71(0.51-0.91)	3.41(0.33-6.50)	0.84	2.35	<0.001	0.58(0.26-0.91)	5.32(0.22-10.4)	0.45	3.04	<0.001	0.50(0.10-0.90)	9.72(0.97-18.50)	0.40	3.83	0.020
3/12 SAU	0.70(0.55-0.84)	4.20(1.60-6.78)	0.67	3.17	<0.001	0.71(0.51-0.91)	3.41(0.33-6.50)	0.84	2.35	<0.001	0.58(0.26-0.91)	5.32(0.22-10.40)	0.45	3.04	<0.001	0.50(0.10-0.90)	9.72(0.97-18.50)	0.40	3.83	0.020
4/12 SAU	0.91(0.81-1.00)	2.11(0.55-3.77)	0.89	1.86	<0.001	0.98(0.80-1.17)	1.18(-1.29-3.64)	0.92	1.65	<0.001	0.78(0.54-1.03)	3.59(0.15-7.03)	0.73	2.15	<0.001	0.89(0.67-1.11)	2.71(-1.70-7.11)	0.88	1.72	<0.001
5/12 SAU	0.84(0.76-0.93)	3.04(1.73-4.36)	0.91	1.69	<0.001	1.09(0.92-1.26)	0.20(-1.97-2.38)	0.94	1.38	<0.001	0.82(0.68-0.97)	3.15(1.12-5.18)	0.89	1.34	<0.001	0.68(0.50-0.87)	6.39(2.47-10.30)	0.86	1.88	<0.001
6/12 SAU	0.80(0.73-0.87)	3.21(2.00-4.44)	0.92	1.61	<0.001	1.00(0.80-1.19)	0.95(-1.67-3.57)	0.91	1.72	<0.001	0.81(0.67-0.95)	3.18(1.16-5.19)	0.89	1.34	<0.001	0.72(0.56-0.89)	4.47(0.71-8.23)	0.89	1.63	<0.001
7/12 SAU	0.82(0.74-0.89)	2.42(1.10-3.76)	0.91	1.65	<0.001	0.89(0.70-1.08)	1.96(-0.71-4.62)	0.90	1.87	<0.001	0.81(0.64-0.98)	2.44(-0.15-5.03)	0.85	1.58	<0.001	0.86(0.66-1.05)	1.25(-3.13-5.63)	0.90	1.60	<0.001
8/12 SAU	0.84(0.75-0.94)	1.88(0.26-3.51)	0.88	1.91	<0.001	0.95(0.83-1.06)	0.84(-0.81-2.49)	0.96	1.10	<0.001	0.71(0.51-0.91)	3.13(-0.12-6.38)	0.76	2.00	<0.001	0.76(0.54-0.98)	4.29(-0.47-9.05)	0.84	1.98	<0.001
9/12 SAU	0.92(0.80-1.03)	0.77(-1.20-2.71)	0.86	2.10	<0.001	0.82(0.62-1.03)	1.58(-1.62-4.77)	0.86	2.14	<0.001	0.85(0.68-1.02)	1.15(-1.55-3.85)	0.87	1.51	<0.001	0.85(0.59-1.11)	3.72(-1.42-8.85)	0.83	2.06	<0.001
10/12 SAU	0.87(0.74-1.00)	1.53(-0.71-3.77)	0.80	2.47	<0.001	0.74(0.54-0.93)	2.40(-0.73-5.53)	0.85	2.22	<0.001	0.90(0.66-1.14)	0.88(-2.70-4.45)	0.79	1.88	<0.001	0.80(0.45-1.16)	4.48(-2.63-11.60)	0.70	2.74	<0.001
11/12 SAU	0.89(0.72-1.05)	1.66(-1.07-4.39)	0.73	2.90	<0.001	0.78(0.61-0.95)	1.06(-1.81-3.92)	0.90	1.88	<0.001	0.93(0.61-1.25)	1.15(-3.42-5.71)	0.69	2.29	<0.001	0.81(0.46-1.17)	5.41(-1.19-12.00)	0.70	2.71	<0.001
12/12 SAU	0.91(0.70-1.11)	2.80(-0.24-5.83)	0.65	3.30	<0.001	0.83(0.66-1.00)	1.99(-0.54-4.53)	0.91	1.78	<0.001	0.89(0.47-1.31)	2.35(-3.36-8.05)	0.54	2.79	<0.001	0.73(0.28-1.17)	8.67(1.32-16.00)	0.54	3.36	0.004

[†]The values are given as the mean and 95% CI in parentheses.[‡]P < 0.05 indicates significance.

1 **Table A5.** Quantitive assessments of the agreements between predicted and measured Overall-FI via sd%

	All patients	Small-to-Medium tear	Large tear	Massive tear
Stage II				
1/3 SAU	9.09	7.06	10.78	7.82
2/3 SAU	4.84	4.27	5.98	3.04
3/3 SAU	8.89	11.28	7.91	2.53
Stage III				
1/6 SAU	15.06	13.03	14.51	16.74
2/6 SAU	8.28	9.80	7.57	5.99
3/6 SAU	6.41	7.03	6.34	5.64
4/6 SAU	5.14	5.23	5.66	3.89
5/6 SAU	8.74	10.67	7.28	8.18
6/6 SAU	11.27	14.09	8.45	10.93
Stage IV				
1/12 SAU	19.26	17.62	19.25	20.25
2/12 SAU	13.37	13.30	13.02	13.33
3/12 SAU	8.25	9.26	6.65	8.58
4/12 SAU	8.92	9.31	9.99	3.92
5/12 SAU	8.17	6.75	8.75	8.32
6/12 SAU	6.44	6.91	5.46	7.19
7/12 SAU	6.97	7.31	6.49	6.38
8/12 SAU	8.80	4.43	11.54	5.58
9/12 SAU	9.50	11.52	7.99	8.52
10/12 SAU	11.27	14.82	8.64	9.81
11/12 SAU	12.62	16.22	9.30	9.57
12/12 SAU	11.82	9.55	10.36	13.59

2 Overall-FI, fatty infiltration in the overall supraspinatus; sd%, the standard deviation (SD) of the percent
3 differences ($\frac{\text{predicted 3D-FI} - \text{measured 3D-FI}}{\text{measured 3D-FI}} \cdot 100\%$).

Appendix Figure A1-A7

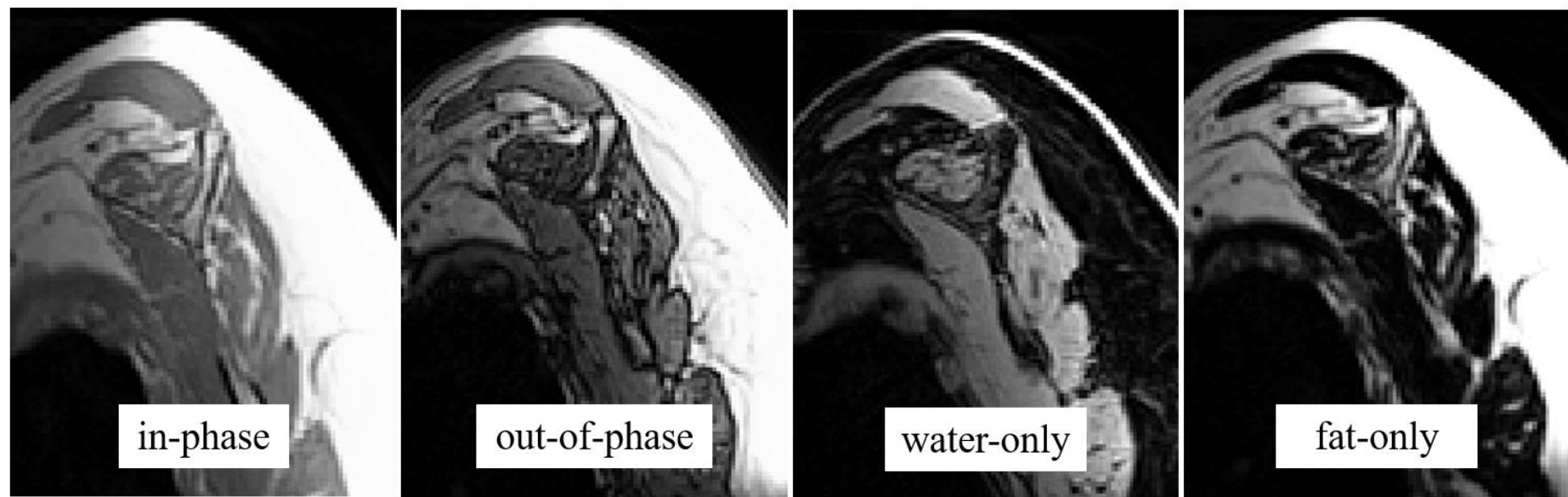


Fig.A1. The in-phase, out-of-phase, water-only, and fat-only images were generated thru the standard Dixon imaging sequence.

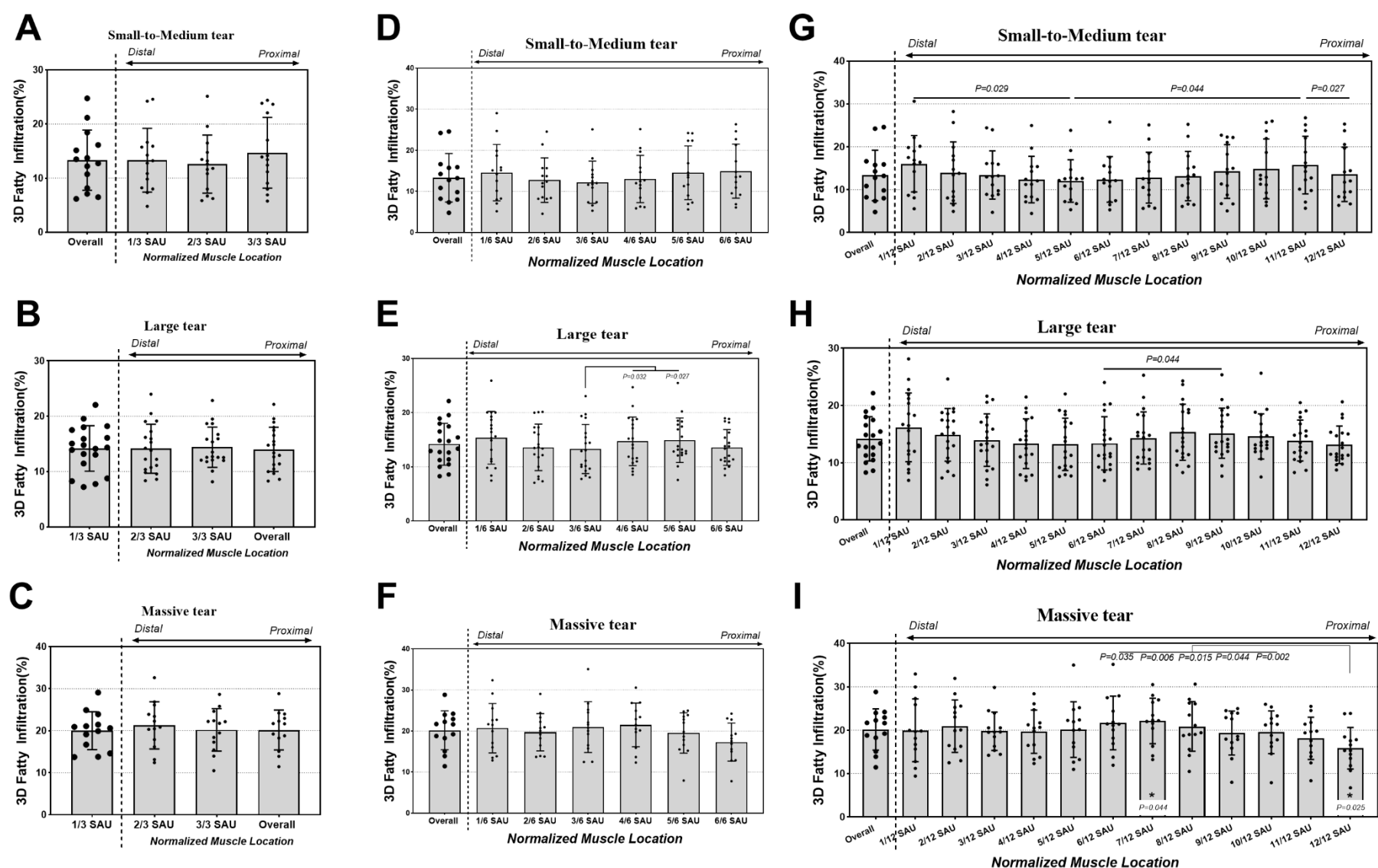


Fig.A2. Comparisons of the three-dimensional(3D) fatty infiltration between the overall supraspinatus (Overall-FI) and the segmented (A-C)1/3-3/3 sectional accumulation units (SAUs), (D-F)1/6-6/6 SAUs, or (G-I)1/12-12/12SAUs (prediction variables) in linear regression models in the (A,D,G) small-to-medium, (B,E,H)large, and (C,F,I) massive tear size subgroups. The SAU-FIs from 1/3 to 3/3 SAUs and from 1/6 to 6/6 SAUs in all tear size subgroups generally showed uniform distributions along the distal-proximal axis. The SAU-FIs from 1/12 to 12/12 SAUs in the medium and large tear subgroups showed slightly bipolar increasing trends, which is not shown in the massive tear. The minor but significant differences are mainly observed in the central portion compared to several adjacent proximal and distal SAUs in the large tear regarding N/6 SAU (E, 3/6 vs. 4/6 and 5/6) and N/12 SAU (H, 6/12 vs. 8/12). Similar differences are detected in the small-to-medium tear regarding N/12 SAU (G, 5/12 vs. 1/12and 1/12). Moreover, regarding N/12 SAU, the 12/12 SAUs are marginally smaller than those in several distal SAUs in the medium (G, 12/12 vs. 11/12a) or massive subgroups (I, 12/12 vs. 6/12, 7/12, 8/12, 9/12 10/12, or 11/12).

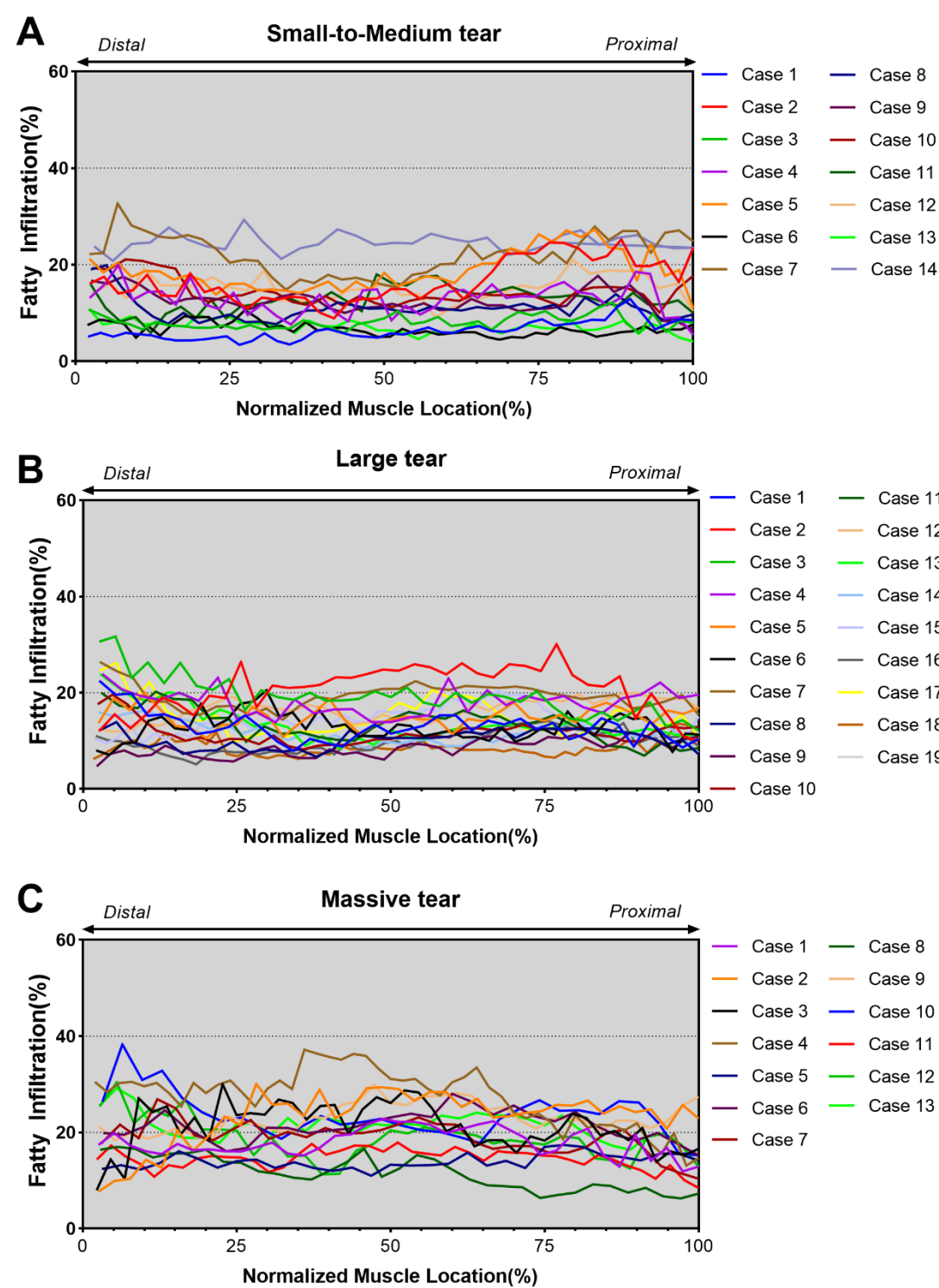


Fig.A3. Distribution of fatty infiltration at every single slice (minimal sectional accumulation unit) along the distal-proximal axis of supraspinatus muscle (0%~100%) in all cases with (A) Small-to-Medium, (B) Large, and (C) Massive tear subgroups. 0%: most lateral distinguishable supraspinatus slice; 100%: most medial supraspinatus muscle at the medial scapular border. Almost all cases exhibited uniform and diffuse distributions with just minor fluctuation, except for a few cases that showed distinct bipolar ascending (cases 2 and 7 in the Small-to-Medium rip) or declining trends (case 4 in the Massive tear). Instead of overall flat trends, these distribution patterns exhibit longitudinally saltatorial oscillation along the baseline.

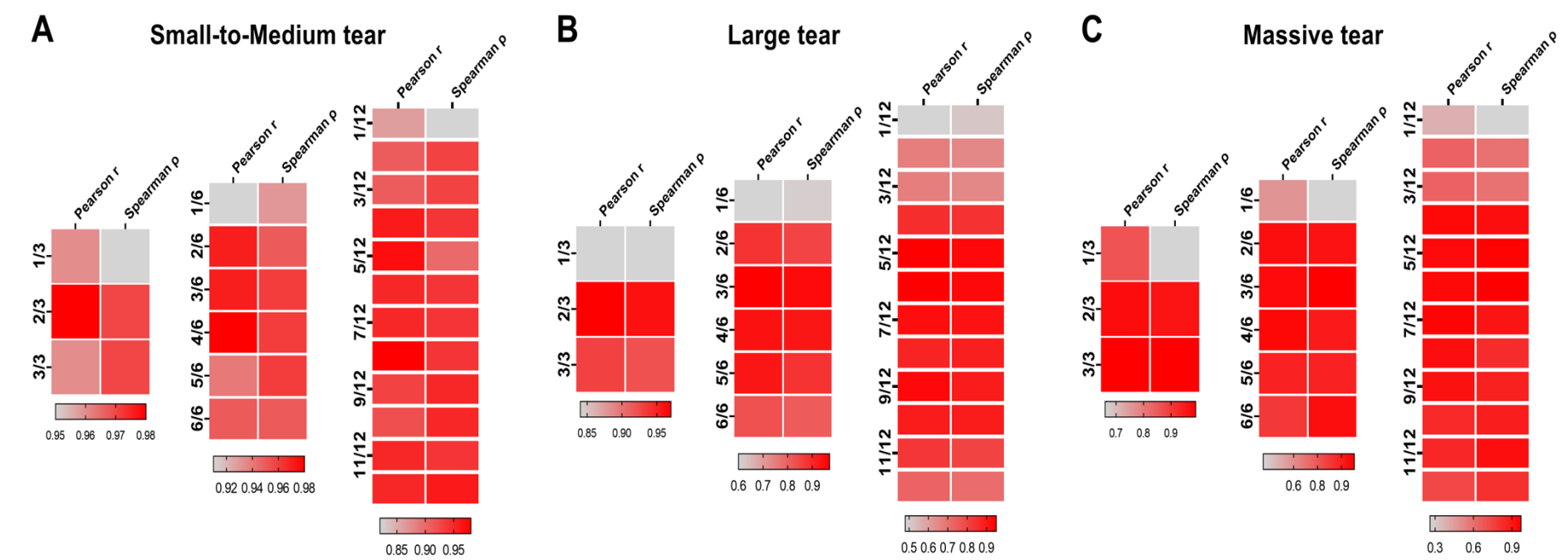


Fig.A4. Heatmaps show Pearson and Spearman correlation coefficients of the three-dimensional fatty infiltration between the overall supraspinatus and the segmented 1/3-3/3 sectional accumulation units (SAUs), 1/6-6/6 SAUs, or 1/12-12/12SAUs in the (A) small-to-medium, (B) large, and (C) massive tear size subgroups. The brightest areas with highest correlation coefficients locate at central supraspinatus portions of 2/3SAU, 3/6-4/6SAUs, and 5/12-7/12SAUs.

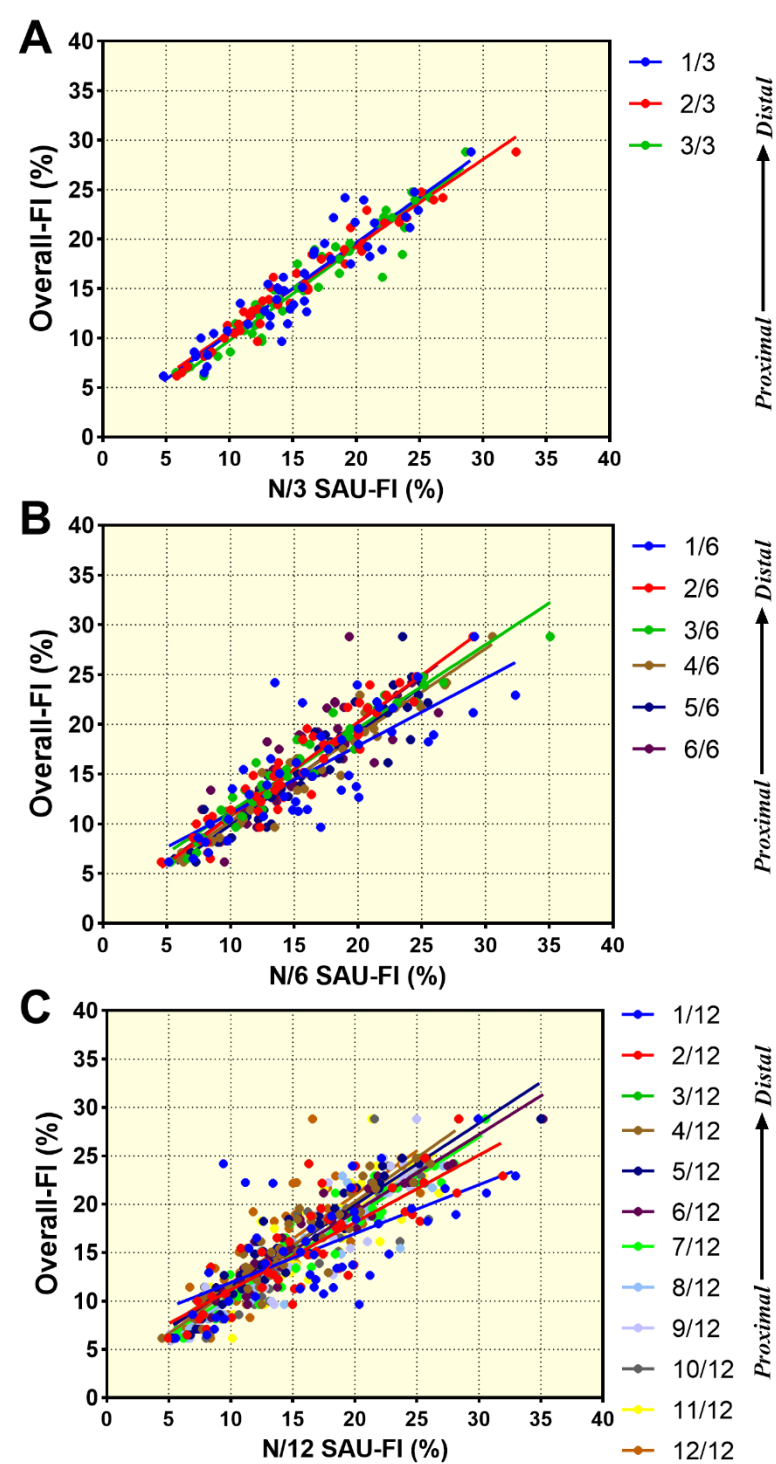


Fig.A5. Scatter plots and linear fits (colored solid lines) of the three-dimensional fatty infiltration between the overall supraspinatus (Overall-FI, outcome variable) and the segmented (A) 1/3-3/3 sectional accumulation units (SAUs), (B) 1/6-6/6 SAUs, or (C) 1/12-12/12SAUs (prediction variables) in linear regression models. The optimal regression models are determined in the central supraspinatus portions of 2/3SAU(R-squared:0.95, RSME:1.18), 3/6-4/6SAUs (R-squared:0.93,RSME:1.44;R-squared:0.93, RSME:1.37), and 5/12-7/12SAUs (R-squared:0.91,RSME:1.69; R-squared:0.92, RSME:1.37; R-squared:0.91, RSME:1.65), showing the best goodness-of-fit.

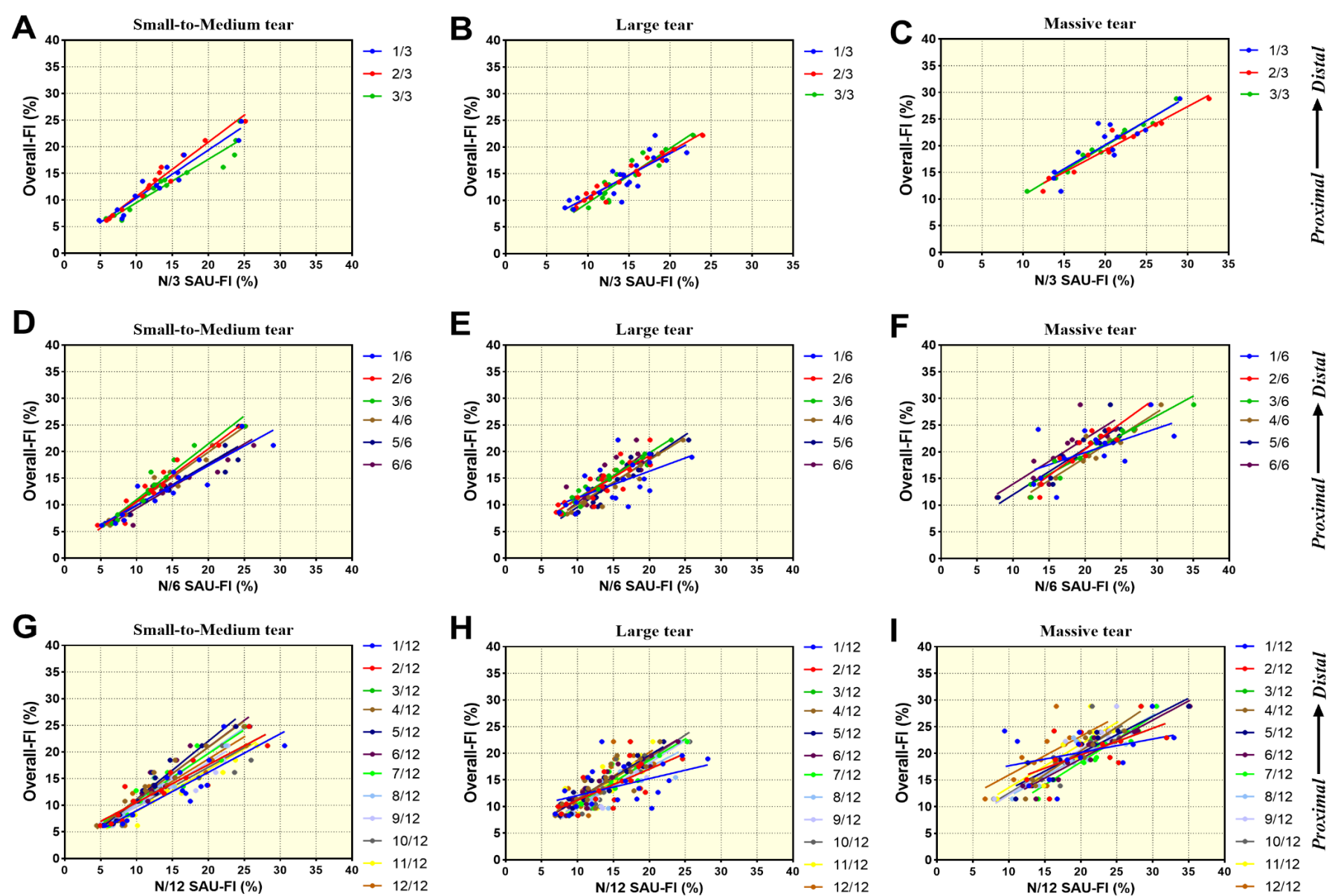


Fig.A6. Scatter plots and linear fits (colored solid lines) of the three-dimensional fatty infiltration between the overall supraspinatus (Overall-FI, outcome variable) and the segmented (A-C)1/3-3/3 sectional accumulation units (SAUs), (D-F)1/6-6/6 SAUs, or (G-I)1/12-12/12SAUs (prediction variables) in linear regression models in the (A,D,G) small-to-medium, (B,E,H)large, and (C,F,I) massive tear size subgroups. The optimal regression models in the segmented 1/3SAU occur at central supraspinatus portions of the 2/3SAU, 3/6-4/6SAUs, and 5/12-7/12SAUs in all subgroups, indicating the best goodness-of-fit.

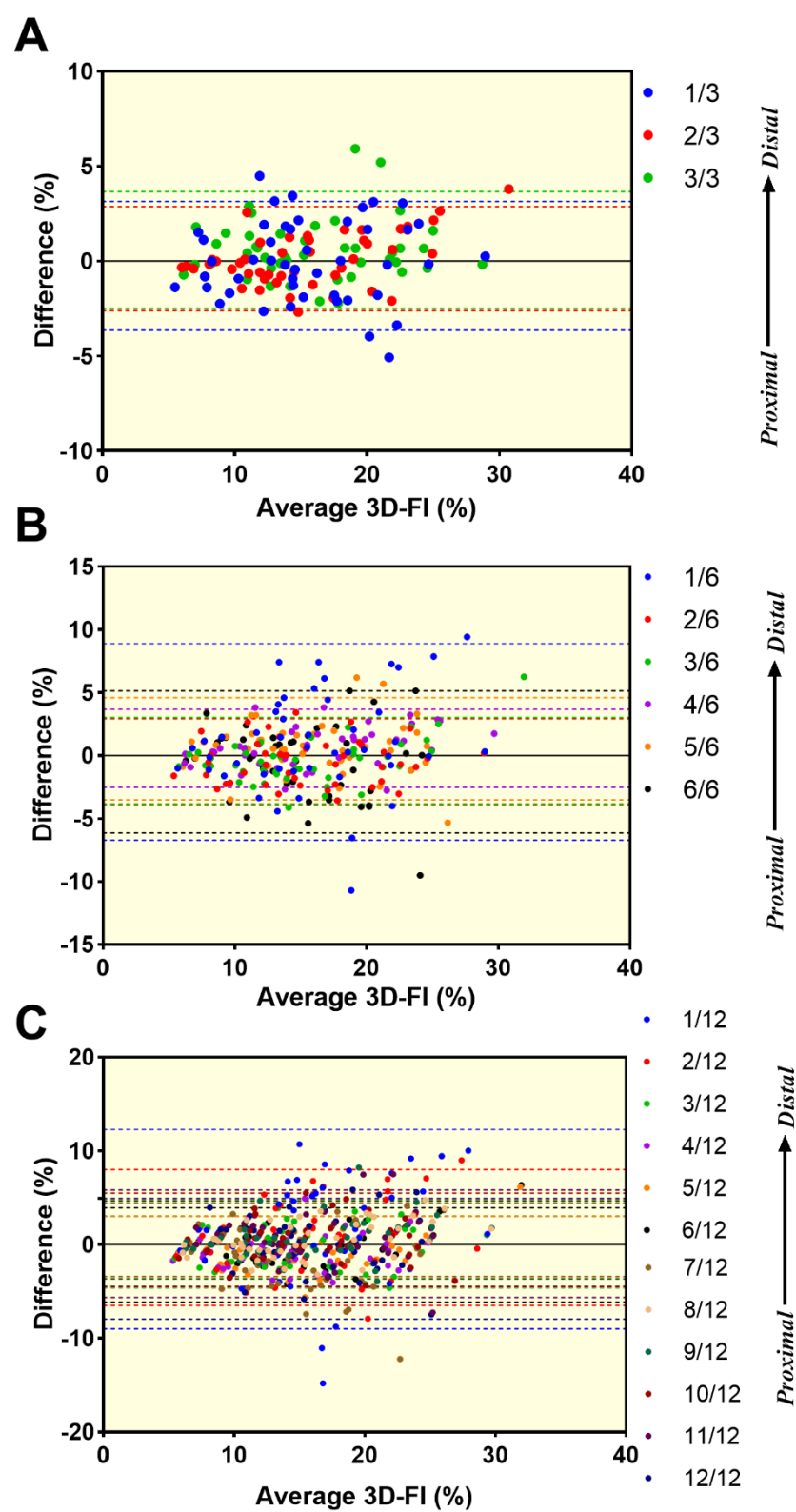


Fig.A7. Bland-Altman plots assess the agreements between the measured-overall fatty infiltration (Overall-FI) and predicted-Overall-FI in the regression models by the segmented (A) 1/3-3/3 sectional accumulation units (SAUs), (B) 1/6-6/6 SAUs, or (C) 1/12-12/12SAUs. Different color dots represent different SAUs. Almost all dots in each 1/3SAU, 1/6SAU, and 1/12SAU were included in their corresponding dot lines that denote the upper and lower limit of agreement (LOA), indicating good agreements. More SAU segmentation resulted in a rise in LOA ranges.