

409 **Table 3. Supplement. Comparison of Failure Properties between Circumferential and Longitudinal**  
 410 **Directions.**

Ascending Aorta					
	Anterior (n=38)	Medial (n=19)	Posterior (n=16)	Lateral (n=34)	Overall (n=107)
Failure Stress (kPa)	1062 (800, 1890) vs 451 (355, 786)	1127 (847, 1197) vs 360 (298, 553)	1539 (1225, 1605) vs 855 (512, 958)	1128 (949, 1504) vs 839 (506, 1074)	1139 (868, 1554) vs 546 (355, 952)
P	0.003	<0.001	0.013	0.058	0.001
Failure Stretch ratio	1.90 (1.63, 2.13) vs 1.81 (1.65, 2.02)	2.20 (1.52, 2.28) vs 1.80 (1.61, 2.11)	1.86 (1.75, 2.00) vs 2.01 (1.75, 2.28)	1.98 (1.57, 2.26) vs 1.78 (1.62, 1.99)	1.94 (1.57, 2.25) vs 1.80 (1.64, 2.06)
P	0.4	0.3	0.2	0.4	0.3
Peak Tangent Modulus (kPa)	3357 (2398, 5092) vs 1153 (791, 2403)	3368 (2006, 5076) vs 1025 (855, 1346)	3239 (2966, 3974) vs 1675 (1419, 1804)	3730 (2626, 4292) vs 1694 (1049, 3706)	3444 (2398, 4639) vs 1419 (918, 2367)
p	<0.001	<0.001	0.01	0.037	0.001
Sinotubular Junction					
	Anterior (n=17)	Medial (n=12)	Posterior (n=3)	Lateral (n=20)	Overall (n=52)
Failure Stress (kPa)	1308 (927, 2172) vs 287 (274, 338)	1140 (808, 2067) vs 450 (211, 707)	737 (704, 770) vs n/a	1233 (631, 1497) vs 664 (339, 888)	1233 (693, 1708) vs 348 (230, 797)
p	0.031	0.015	n/a	0.067	<0.001
Failure Stretch ratio	1.63 (1.49, 1.97) vs 1.75 (1.52, 1.85)	1.57 (1.46, 1.69) vs 2.02 (1.88, 2.33)	1.50 (1.41, 1.59) vs n/a	1.50 (1.25, 1.91) vs 1.70 (1.66, 1.82)	1.57 (1.42, 1.90) vs 1.83 (1.66, 2.08)
p	0.5	0.023	n/a	0.3	0.034
Peak Tangent Modulus (kPa)	4388 (2810, 8809) vs 1375 (938, 1575)	6197 (3808, 9019) vs 605 (484, 1085)	3971 (3780, 4161) vs n/a	3988 (2494, 8152) vs 2436 (903, 3418)	4272 (2830, 8809) vs 1151 (536, 2718)
p	0.015	0.004	n/a	0.041	<0.001
Sinus of Valsalva					
	RCS (n=13)	LCS (n=11)	NCS (n=14)	Overall (n=38)	
Failure Stress (kPa)	1338 (1046, 2682) vs 332 (288, 539)	2205 (1067, 2699) vs 342 (211, 546)	1135 (749, 2126) vs 576 (437, 782)	1344 (874, 2576) vs 454 (279, 657)	
p	n/a	0.06	0.09	<0.001	
Failure Stretch Ratio	1.82 (1.59, 2.05) vs 1.65 (1.53, 2.41)	1.86 (1.73, 2.03) vs 1.82 (1.57, 1.90)	1.50 (1.41, 1.80) vs 1.80 (1.69, 1.93)	1.77 (1.52, 2.01) vs 1.74 (1.52, 2.05)	

p	n/a	0.4	0.25	0.048	
Peak Tangent Modulus (kPa)	6147 (4038, 11141) vs 855 (420, 1184)	6853 (950, 10190) vs 527 (305, 867)	4783 (4386, 6603) vs 1111 (843, 2073)	5693 (2586, 9536) vs 866 (397, 1322)	
p	n/a	0.042	0.008	<0.001	

411 RCS: right coronary sinus. LCS: left coronary sinus. NCS: noncoronary sinus.

412 **Table 4. Supplement. Comparison of Failure Properties of aTAA Regions.**

Ascending Aorta vs STJ Circumferential					
	Anterior	Medial	Posterior	Lateral	Overall
Failure stress (kPa)	1062 (800, 1890) vs 1308 (927, 2172)	1127 (847, 1197) vs 1140 (808, 2067)	1539 (1225, 1605) vs 737 (704, 770)	1128 (949, 1504) vs 1233 (631, 1497)	1139 (868, 1554) vs 1233 (693, 1708)
p	0.2	0.4	N/A	0.5	0.5
Failure stretch ratio	1.90 (1.63, 2.13) vs 1.63 (1.49, 1.97)	2.20 (1.52, 2.28) vs 1.57 (1.46, 1.69)	1.86 (1.75, 2.00) vs 1.50 (1.41, 1.59)	1.98 (1.57, 2.26) vs 1.50 (1.25, 1.91)	1.94 (1.57, 2.25) vs 1.57 (1.42, 1.90)
p	0.2	0.2	N/A	0.03	0.003
Peak tangent modulus (kPa)	3357 (2399, 5092) vs 4388 (2810, 8809)	3368 (2006, 5076) vs 6197 (3808, 9019)	3239 (2966, 3974) vs 3971 (3780, 4161)	3730 (2626, 4292) vs 3988 (2494, 8152)	3444 (2398, 4639) vs 4272 (2830, 8809)
p	0.099	0.1	N/A	0.2	0.027
Ascending Aorta vs STJ Longitudinal					
	Anterior	Medial	Posterior	Lateral	Overall
Failure stress (kPa)	451 (355, 786) vs 287 (274, 338)	360 (298, 554) vs 450 (211, 707)	855 (512, 958) vs N/A	839 (506, 1074) vs 664 (339, 888)	546 (355, 952) vs 348 (230, 797)
p	0.1	0.4	N/A	0.2	0.04
Failure Stretch ratio	1.81 (1.64, 2.02) vs 1.75 (1.52, 1.85)	1.80 (1.61, 2.11) vs 2.02 (1.88, 2.33)	2.01 (1.75, 2.28) vs N/A	1.78 (1.62, 1.99) vs 1.70 (1.66, 1.82)	1.80 (1.64, 2.06) vs 1.83 (1.66, 2.08)
p	0.2	0.1	N/A	0.2	0.4
Peak tangent modulus (kPa)	1153 (791, 2403) vs 1375 (938, 1575)	1025 (855, 1346) vs 605 (484, 1085)	1675 (1419, 1804) vs N/A	1694 (1049, 3706) vs 2436 (903, 3418)	1419 (918, 2367) vs 1151 (536, 2718)
p	0.4	0.2	N/A	0.4	0.2
Ascending Aorta vs. Sinus Circumferential					
	Anterior /RCS	Medial/LCS	Lateral/NCS	Overall	
Failure stress (kPa)	1062 (800, 1890) vs 1338 (1046, 2682)	1127 (847, 1197) vs 2205 (1067, 2699)	1128 (949, 1504) vs 1135 (749, 2126)	1139 (868, 1554) vs 1344 (874, 2576)	
p	N/A	0.2	0.4	0.2	

Failure Stretch ratio	1.90 (1.63, 2.13) vs 1.82 (1.59, 2.05)	2.20 (1.52, 2.28) vs 1.86 (1.73, 2.03)	1.98 (1.57, 2.26) vs 1.50 (1.41, 1.80)	1.94 (1.57, 2.25) vs 1.77 (1.52, 2.01)	
p	N/A	0.3	0.057	0.1	
Peak tangent modulus (kPa)	3357 (2399, 5092) vs 6147 (4038, 11141)	3368 (2006, 5076) vs 6853 (950, 10190)	3730 (2626, 4292) vs 4783 (4386, 6603)	3444 (2398, 4639) vs 5693 (2586, 9536)	
p	N/A	0.4	0.08	0.07	
Ascending Aorta vs. Sinus Longitudinal					
	Anterior/RCS	Medial/LCS	Lateral/NCS	Overall	
Failure stress (kPa)	451 (355, 786) vs 332 (288, 539)	360 (298, 554) vs 342 (211, 546)	839 (506, 1074) vs 576 (437, 782)	546 (355, 952) vs 454 (279, 657)	
p	0.1	0.3	0.1	0.056	
Failure stretch ratio	1.81 (1.64, 2.02) vs 1.65 (1.53, 2.41)	1.80 (1.61, 2.11) vs 1.82 (1.57, 1.90)	1.78 (1.62, 1.99) vs 1.80 (1.69, 1.93)	1.80 (1.64, 2.06) vs 1.74 (1.52, 2.05)	
p	0.3	0.5	0.4	0.25	
Peak tangent modulus (kPa)	1153 (791, 2403) vs 855 (420, 1184)	1025 (855, 1346) vs 527 (305, 867)	1694 (1049, 3706) vs 1111 (843, 2073)	1419 (918, 2367) vs 866 (397, 1322)	
p	0.046	0.07	0.08	0.005	
STJ vs. Sinus Circumferential					
	Anterior/RCS	Medial/LCS	Lateral/NCS	Overall	
Failure stress (kPa)	1308 (927, 2172) vs 1338 (1046, 2682)	1140 (808, 2067) vs 2205 (1067, 2699)	1233 (631, 1497) vs 1135 (749, 2126)	1233 (693, 1708) vs 1344 (874, 2576)	
p	N/A	0.3	0.4	0.2	
Failure stretch ratio	1.63 (1.49, 1.97) vs 1.82 (1.59, 2.05)	1.57 (1.46, 1.69) vs 1.86 (1.73, 2.03)	1.50 (1.25, 1.91) vs 1.50 (1.41, 1.80)	1.57 (1.42, 1.90) vs 1.77 (1.52, 2.01)	
p	N/A	0.06	0.5	0.1	
Peak tangent modulus (kPa)	4388 (2810, 8809) vs 6147 (4038, 11141)	6197 (3808, 9019) vs 6853 (950, 10190)	3988 (2494, 8152) vs 4783 (4386, 6603)	4272 (2830, 8809) vs 5693 (2586, 9536)	
p	N/A	0.4	0.3	0.3	
STJ vs. Sinus Longitudinal					
	Anterior/RCS	Medial/LCS	Lateral/NCS	Overall	
Failure stress (kPa)	287 (274, 338) vs 332 (288, 539)	450 (211, 707) vs 342 (211, 546)	664 (339, 888) vs 576 (437, 782)	348 (230, 797) vs 454 (279, 657)	
p	0.3	0.4	0.5	0.4	
Failure stretch ratio	1.75 (1.52, 1.85) vs 1.65 (1.53, 2.41)	2.02 (1.88, 2.33) vs 1.82 (1.57, 1.90)	1.70 (1.66, 1.82) vs 1.80 (1.69, 1.93)	1.83 (1.66, 2.08) vs 1.74 (1.52, 2.05)	
p	0.4	0.2	0.2	0.4	

Peak tangent modulus (kPa )	1375 (938, 1575) vs 855 (420, 1184)	605 (484, 1085) vs 527 (305, 867)	2436 (903, 3418) vs 1111 (843, 2073)	1151 (536, 2718) vs 866 (397, 1322)	
p	0.1	0.3	0.2	0.15	

413 RCS: right coronary sinus. LCS: left coronary sinus. NCS: noncoronary sinus.

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417 **Table 5. Supplement. Comparison of Failure Properties of Subregions within AscAo, STJ, and**  
 418 **SOV.**

Ascending Aorta Circumferential						
	Anterior vs Medial	Anterior vs Posterior	Anterior vs Lateral	Medial vs Posterior	Medial vs Lateral	Posterior vs Lateral
Failure Stress (kPa )	1062 (800, 1890) vs 1127 (847, 1197)	1062 (800, 1890) vs 1539 (1225, 1605)	1062 (800, 1890) vs 1128 (949, 1504)	1127 (847, 1197) vs 1539 (1225, 1605)	1127 (847, 1197) vs 1128 (949, 1504)	1539 (1225, 1605) vs 1128 (949, 1504)
p	0.4	0.2	0.5	0.1	0.4	0.1
Failure Stretch ratio	1.90 (1.63, 2.13) vs 2.20 (1.52, 2.28)	1.90 (1.63, 2.13) vs 1.86 (1.75, 2.00)	1.90 (1.63, 2.13) vs 1.98 (1.57, 2.26)	2.20 (1.52, 2.28) vs 1.86 (1.75, 2.00)	2.20 (1.52, 2.28) vs 1.98 (1.57, 2.26)	1.86 (1.75, 2.00) vs 1.98 (1.57, 2.26)
p	0.2	0.5	0.2	0.4	0.5	0.3
Peak Tangent Modulus (kPa )	3357 (2398, 5092) vs 3368 (2006, 5076)	3357 (2398, 5092) vs 3239 (2966, 3974)	3357 (2398, 5092) vs 3730 (2626, 4292)	3368 (2006, 5076) vs 3239 (2966, 3974)	3368 (2006, 5076) vs 3730 (2626, 4292)	3239 (2966, 3974) vs 3730 (2626, 4292)
p	0.4	0.4	0.4	0.5	0.4	0.4
Ascending Aorta Longitudinal						
	Anterior vs Medial	Anterior vs Posterior	Anterior vs Lateral	Medial vs Posterior	Medial vs Lateral	Posterior vs Lateral
Failure Stress (kPa )	451 (355, 786) vs 360 (298, 554)	451 (355, 786) vs 855 (512, 958)	451 (355, 786) vs 839 (506, 1074)	360 (298, 554) vs 855 (512, 958)	360 (298, 554) vs 839 (506, 1074)	855 (512, 958) vs 839 (506, 1074)
p	0.1	0.046	0.055	0.004	0.007	0.4
Failure Stretch ratio	1.81 (1.65, 2.02) vs 1.80 (1.61, 2.11)	1.81 (1.65, 2.02) vs 2.01 (1.75, 2.28)	1.81 (1.65, 2.02) vs 1.78 (1.62, 1.99)	1.80 (1.61, 2.11) vs 2.01 (1.75, 2.28)	1.80 (1.61, 2.11) vs 1.78 (1.62, 1.99)	2.01 (1.75, 2.28) vs 1.78 (1.62, 1.99)
p	0.5	0.1	0.5	0.2	0.5	0.1
Peak Tangent Modulus (kPa )	1153 (791, 2403) vs 1025 (855, 1346)	1153 (791, 2403) vs 1675 (1419, 1804)	1153 (791, 2403) vs 1694 (1049, 3706)	1025 (855, 1346) vs 1675 (1419, 1804)	1025 (855, 1346) vs 1694 (1049, 3706)	1675 (1419, 1804) vs 1694 (1049, 3706)
p	0.2	0.25	0.2	0.009	0.014	0.3
STJ Circumferential				STJ Longitudinal		
	Anterior vs Medial	Anterior vs Lateral	Medial vs Lateral	Anterior vs Medial	Anterior vs Lateral	Medial vs Lateral
Failure Stress (kPa )	1308 (927, 2172) vs 1140 (808, 2067)	1308 (927, 2172) vs 1233 (631, 1497)	1140 (808, 2067) vs 1233 (631, 1497)	287 (274, 338) vs 450 (211, 707)	287 (274, 338) vs 664 (339, 888)	450 (211, 707) vs 664 (339, 888)
p	0.5	0.2	0.3	0.4	0.2	0.2

Failure Stretch ratio	1.63 (1.49, 1.97) vs 1.57 (1.46, 1.69)	1.63 (1.49, 1.97) vs 1.50 (1.25, 1.91)	1.57 (1.46, 1.69) vs 1.50 (1.25, 1.91)	1.75 (1.52, 1.85) vs 2.02 (1.88, 2.32)	1.75 (1.52, 1.85) vs 1.70 (1.66, 1.82)	2.02 (1.88, 2.32) vs 1.70 (1.66, 1.82)
p	0.2	0.2	0.4	0.085	0.5	0.041
Peak Tangent Modulus (kPa)	4388 (2810, 8809) vs 6197 (3808, 9019)	4388 (2810, 8809) vs 3988 (2494, 8152)	6197 (3808, 9019) vs 3988 (2494, 8152)	1375 (938, 1575) vs 605 (484, 1085)	1375 (938, 1575) vs 2436 (903, 3418)	605 (484, 1085) vs 2436 (903, 3418)
p	0.4	0.3	0.2	0.06	0.4	0.1
	Sinus Circumferential			Sinus Longitudinal		
	RCS vs LCS	RCS vs NCS	LCS vs NCS	RCS vs LCS	RCS vs NCS	LCS vs NCS
Failure Stress (kPa)	1338 (1046, 2682) vs 2205 (1067, 2699)	1338 (1046, 2682) vs 1135 (749, 2126)	2205 (1067, 2699) vs 1135 (749, 2126)	332 (288, 539) vs 342 (211, 546)	332 (288, 539) vs 576 (437, 782)	342 (211, 546) vs 576 (437, 782)
p	N/A	N/A	0.3	0.3	0.09	0.2
Failure Stretch ratio	1.82 (1.59, 2.05) vs 1.86 (1.73, 2.03)	1.82 (1.59, 2.05) vs 1.50 (1.41, 1.80)	1.86 (1.73, 2.03) vs 1.50 (1.41, 1.80)	1.65 (1.53, 2.41) vs 1.82 (1.57, 1.90)	1.65 (1.53, 2.41) vs 1.80 (1.69, 1.93)	1.82 (1.57, 1.90) vs 1.80 (1.69, 1.93)
p	N/A	N/A	0.07	0.4	0.3	0.5
Peak Tangent Modulus (kPa)	6147 (4038, 11141) vs 6853 (950, 10190)	6147 (4038, 11141) vs 4783 (4386, 6603)	6853 (950, 10190) vs 4783 (4386, 6603)	855 (420, 1184) vs 527 (305, 867)	855 (420, 1184) vs 1111 (843, 2073)	527 (305, 867) vs 1111 (843, 2073)
p	N/A	N/A	0.5	0.3	0.3	0.1

419 RCS: right coronary sinus. LCS: left coronary sinus. NCS: noncoronary sinus.

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