

### Torsion calculation

The ROC analysis with AUC (95% CI) for each variant of torsion calculation appears in *Table S1*. Using two slices and three slices above and below provided very similar results, with the latter variant proving slightly better in terms of average area under the curve (AUC). The only worse AUC value was at C3/4 level, with the lowest number of compressions. This study therefore employed variant with three slices above and below.

**Table S1** Comparison of AUC (95% CI) in various approaches to torsion calculation (with angle correction)

	Torsion v1	Torsion v2	Torsion v3
C3/4	0.737 (0.600, 0.873)	0.772 (0.647, 0.897)	0.737 (0.607, 0.868)
C4/5	0.696 (0.606, 0.786)	0.762 (0.679, 0.844)	0.764 (0.683, 0.844)
C5/6	0.661 (0.575, 0.746)	0.748 (0.671, 0.824)	0.774 (0.701, 0.847)
C6/7	0.633 (0.526, 0.741)	0.694 (0.587, 0.801)	0.719 (0.615, 0.824)

### Angle correction

The differences between SCT-derived parameters with and without angle correction in HC and levels with compression appear in *Table S2*. The difference was defined as uncorrected minus corrected. The difference was significant in almost all parameters and all levels, except CR (and eccentricity) and torsion. In accord with the anatomical curvature of the spine, the greatest differences between corrected and uncorrected values appeared in AP diameter (and subsequently in CR and eccentricity), as well as in CSA at levels C3/4 and C6/7. Repeated measures ANOVA found no difference between levels in RL and solidity, although there were differences in AP, CR, CSA, eccentricity, and torsion.

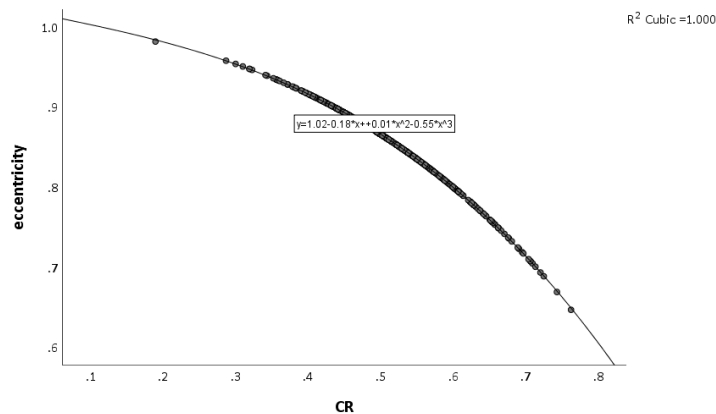
**Table S2** Differences between parameters extracted with and without angle correction for HC and levels with compressions in SCC

		Healthy controls	P value	Levels with compressions	P value
RL (mm)					
	C3/4	0.02 (0, 0.06)	<0.0005	0.04 (0, 0.22)	<0.0005
	C4/5	0.02 (0, 0.06)	<0.0005	0.02 (0, 0.11)	<0.0005
	C5/6	0.02 (0, 0.07)	<0.0005	0.02 (0, 0.09)	<0.0005
	C6/7	0.02 (-0.01, 0.07)	<0.0005	0.02 (0, 0.10)	<0.0005
AP (mm)					
	C3/4	0.06 (0, 0.33)	<0.0005	0.04 (0, 0.26)	<0.0005
	C4/5	0.01 (0, 0.07)	<0.0005	0.01 (0, 0.10)	<0.0005
	C5/6	0.01 (0, 0.08)	<0.0005	0.01 (0, 0.10)	<0.0005
	C6/7	0.08 (0, 0.56)	<0.0005	0.02 (0, 0.26)	<0.0005
CR (%)					
	C3/4	0.44 (-0.11, 2.47)	<0.0005	0.12 (-0.73, 1.88)	0.051
	C4/5	-0.01 (-0.19, 0.49)	0.140	0.00 (-0.39, 0.66)	0.164
	C5/6	0.00 (-0.11, 0.63)	<0.0005	0.00 (-0.22, 0.69)	0.032
	C6/7	0.54 (-0.03, 4.8)	<0.0005	0.03 (-0.29, 1.79)	0.003
CSA (mm <sup>2</sup> )					
	C3/4	0.63 (0.04, 2.84)	<0.0005	0.41 (0.02, 2.48)	<0.0005
	C4/5	0.12 (0.02, 0.65)	<0.0005	0.14 (0.02, 1.09)	<0.0005
	C5/6	0.23 (0.01, 1.2)	<0.0005	0.14 (0.01, 1.02)	<0.0005
	C6/7	0.81 (0.05, 5.11)	<0.0005	0.24 (0.00, 2.65)	<0.0005
Solidity (%)					
	C3/4	-0.44 (-1.1, -0.06)	<0.0005	-0.60 (-1.60, -0.20)	<0.0005
	C4/5	-0.39 (-0.96, 0.01)	<0.0005	-0.45 (-1.22, -0.05)	<0.0005
	C5/6	-0.44 (-0.89, 0.00)	<0.0005	-0.55 (-1.14, -0.05)	<0.0005
	C6/7	-0.43 (-1.48, -0.02)	<0.0005	-0.50 (-1.33, 0.00)	<0.0005
Torsion (degree)					
	C3/4	0.02 (-0.06, 0.10)	0.001	0.00 (-0.07, 0.29)	0.230
	C4/5	0.00 (-0.05, 0.05)	0.517	0.00 (-0.04, 0.09)	0.791
	C5/6	0.00 (-0.04, 0.12)	0.343	0.00 (-0.06, 0.07)	0.767
	C6/7	0.03 (-0.05, 0.47)	<0.0005	0.00 (-0.05, 0.21)	0.285

The P values represent the significance of paired *t*-test (RL, AP, CR, CSA,) and Wilcoxon signed ranks test (solidity, torsion).

There was almost no difference in ROC analyses of compression detection based on values without and with angle correction, respectively (average AUC was 0.858 *vs.* 0.853 for C3/4, 0.794 *vs.* 0.792 for C4/5, 0.783 *vs.* 0.780 for C5/6 and 0.772 *vs.* 0.774 for C6/7).

### Relationship between eccentricity and CR



**Figure S1** The relationship between eccentricity and CR is cubic, with  $R^2=1$ .

## Normative data using values without angle correction

**Table S3** Normative data of parameters without angle correction, compression characteristics, and proposed cut-offs based on ROC analysis

	Healthy controls	Levels with compressions	Cut-off	AUC (95% CI)	Sensitivity	Specificity
RL (mm)						
C3/4	12.6±1.1	13.2±1.2				
C4/5	13.3±1.1	13.8±1.2				
C5/6	13.2±1.1	13.3±1.5				
C6/7	12.2±1.2	12.3±1.1				
AP (mm)						
C3/4	7.4±0.5	6.1±0.8				
C4/5	7.3±0.6	6.2±0.8				
C5/6	7.0±0.6	6.1±0.8				
C6/7	6.7±0.6	5.7±0.6				
CR (%)						
C3/4	59.3±6.4	46.3±6.2	52.4	0.944 (0.898, 0.990)	87.5	87.9
C4/5	55.1±6.4	45.8±6.8	51.5	0.850 (0.786, 0.915)	83.1	74.2
C5/6	53.5±6.3	46.2±6.6	49.6	0.793 (0.724, 0.862)	68.5	77.3
C6/7	55.8±6.6	47.0±5.7	51.1	0.849 (0.776, 0.922)	83.3	75.8
CSA (mm <sup>2</sup> )						
C3/4	72.6±8.2	60.1±10.9	66.7	0.883 (0.794, 0.971)	87.5	81.8
C4/5	75.6±8.6	64.6±10.0	69.2	0.806 (0.731, 0.882)	73.8	80.3
C5/6	71.8±9.5	61.0±10.8	61.1	0.779 (0.707, 0.850)	55.1	90.9
C6/7	63.7±9.5	53.9±8.5	57.2	0.786 (0.696, 0.877)	71.4	78.8
Solidity (%)						
C3/4	96.3 (94.2, 97.8)	93.7 (87.9, 96.8)	95.2	0.877 (0.784, 0.970)	79.2	89.4
C4/5	96.0 (93.7, 97.4)	94.3 (87.3, 97.2)	94.6	0.754 (0.669, 0.839)	60.0	86.4
C5/6	95.9 (93.4, 97.7)	93.9 (85.1, 97.0)	94.2	0.794 (0.725, 0.863)	58.4	89.4
C6/7	95.6 (93.2, 98.1)	94.4 (90.6, 97.0)	94.6	0.748 (0.652, 0.844)	66.7	74.2
Torsion (degree)						
C3/4	0.84 (0.45, 1.99)	1.48 (0.53, 3.81)	1.33	0.729 (0.598, 0.861)	58.3	87.9
C4/5	0.70 (0.26, 1.60)	1.25 (0.49, 2.86)	0.94	0.764 (0.683, 0.844)	72.3	72.7
C5/6	0.91 (0.44, 1.69)	1.33 (0.58, 3.17)	1.12	0.766 (0.691, 0.841)	74.2	71.2
C6/7	1.22 (0.53, 2.82)	2.12 (0.58, 3.89)	2.10	0.704 (0.599, 0.810)	52.4	86.4

Data are presented as mean ± SD where normally distributed, median (5th–95th percentile) for data without normal distribution. The values were calculated from 66 HC, 24 compressions at C3/4 level, 65 at C4/5, 89 at C5/6 and 42 at C6/7.

## Compression detection using values without angle correction

**Table S4** Models for automated compression detection employing morphometric parameters without angle correction

	Coefficients	OR (95% CI)	p-value (factors)	p-value (model)	Nagelkerke R <sup>2</sup>	AUC (95% CI) of predicted probabilities
C3/4				<0.0005	0.848	0.978 (0.948, 1.000)
Constant	71.339		0.061			
CR (%)	-0.462	0.630 (0.457, 0.869)	0.005			
CSA (mm <sup>2</sup> )	-0.174	0.841 (0.713, 0.991)	0.038			
Solidity (%)	-0.399	0.671 (0.312, 1.445)	0.308			
Torsion (degree)	2.128	8.399 (0.354, 199.542)	0.188			
C4/5				<0.0005	0.723	0.943 (0.904, 0.981)
Constant	51.939		0.003			
CR (%)	-0.272	0.762 (0.670, 0.867)	<0.0005			
CSA (mm <sup>2</sup> )	-0.100	0.904 (0.839, 0.975)	0.009			
Solidity (%)	-0.356	0.701 (0.491, 1.000)	0.050			
Torsion (degree)	2.679	14.566 (3.716, 57.098)	<0.0005			
C5/6				<0.0005	0.712	0.940 (0.905, 0.976)
Constant	70.725		0.001			
CR (%)	-0.190	0.827 (0.740, 0.924)	0.001			
CSA (mm <sup>2</sup> )	-0.069	0.934 (0.881, 0.989)	0.020			
Solidity (%)	-0.633	0.531 (0.344, 0.819)	0.004			
Torsion (degree)	3.385	29.517 (6.832, 127.519)	<0.0005			
C6/7				<0.0005	0.800	0.964 (0.931, 0.997)
Constant	85.839		0.002			
CR (%)	-0.427	0.653 (0.54, 0.79)	<0.0005			
CSA (mm <sup>2</sup> )	-0.171	0.843 (0.763, 0.931)	0.001			
Solidity (%)	-0.606	0.546 (0.321, 0.926)	0.025			
Torsion (degree)	1.869	6.482 (2.302, 18.248)	<0.0005			
Pooled model				<0.0005	0.740	0.948 (0.930, 0.967)
Constant	57.679		<0.0005			
CR (%)	-0.269	0.764 (0.716, 0.816)	<0.0005			
CSA (mm <sup>2</sup> )	-0.099	0.906 (0.871, 0.941)	<0.0005			
Solidity (%)	-0.443	0.642 (0.517, 0.798)	<0.0005			
Torsion (degree)	2.088	8.072 (4.484, 14.531)	<0.0005			
Level C6/7 (yes or no)	-2.603	0.074 (0.030, 0.183)	<0.0005			

Models were constructed over data from HC and from levels with compression in SCC.

## Cross-validation of the pooled model

The cross-validation of the pooled model was performed by constructing 6 models, each over 5/6 of the data from levels with compression and levels in healthy controls, ROC analysis with definition of the best cut-off for predicted probability employing the Youden index and then calculating the probability, and consequently sensitivity and specificity of compression detection, in the remaining 1/6 of participants. The results appear in *Table S5*. The overall sensitivity of compression detection in participants that were not used for model construction was 0.836, specificity 0.905, positive predictive value 0.880 and negative predictive value 0.869. *Table S-5* also shows very similar coefficients for each of the six models, suggesting great stability for the model predictions.

**Table S5** Cross validation of compression detection. Each of the six models was constructed over 5/6 of data and the remaining 1/6 of data was used to calculate sensitivity and specificity of compression detection using the predicted probability acquired from that model

	Coefficients	OR (95% CI)	P value (factors)	P value (model)	Nagelkerke R <sup>2</sup>	AUC (95% CI) of predicted probabilities
Model 1				<0.0005	0.727	0.944 (0.923, 0.966)
Constant	57.806		<0.0005			
CR (%)	-0.262	0.77 (0.716, 0.827)	<0.0005			Cut-off: 0.465
CSA (mm <sup>2</sup> )	-0.103	0.903 (0.866, 0.941)	<0.0005			Sensitivity: 0.917
Solidity (%)	-0.416	0.66 (0.517, 0.842)	0.001			Specificity: 0.886
Torsion (degree)	2.110	8.244 (4.398, 15.455)	<0.0005			
C67	-2.742	0.064 (0.024, 0.171)	<0.0005			
Model 2				<0.0005	0.718	0.941 (0.919, 0.963)
Constant	48.626		<0.0005			
CR (%)	-0.257	0.773 (0.722, 0.828)	<0.0005			Cut-off: 0.491
CSA (mm <sup>2</sup> )	-0.095	0.909 (0.874, 0.946)	<0.0005			Sensitivity: 0.919
Solidity (%)	-0.331	0.718 (0.573, 0.9)	0.004			Specificity: 0.886
Torsion (degree)	2.330	10.277 (5.287, 19.976)	<0.0005			
C67	-2.506	0.082 (0.032, 0.208)	<0.0005			
Model 3				<0.0005	0.772	0.958 (0.941, 0.976)
Constant	72.581		<0.0005			
CR (%)	-0.308	0.735 (0.676, 0.798)	<0.0005			Cut-off: 0.485
CSA (mm <sup>2</sup> )	-0.090	0.914 (0.875, 0.955)	<0.0005			Sensitivity: 0.676
Solidity (%)	-0.559	0.572 (0.442, 0.739)	<0.0005			Specificity: 0.932
Torsion (degree)	2.341	10.392 (5.082, 21.252)	<0.0005			
C67	-2.715	0.066 (0.024, 0.185)	<0.0005			
Model 4				<0.0005	0.713	0.94 (0.918, 0.962)
Constant	48.811		<0.0005			
CR (%)	-0.266	0.766 (0.715, 0.822)	<0.0005			Cut-off: 0.466
CSA (mm <sup>2</sup> )	-0.094	0.91 (0.872, 0.949)	<0.0005			Sensitivity: 0.89

*Table S5 (continued)*

**Table S5** (continued)

	Coefficients	OR (95% CI)	P value (factors)	P value (model)	Nagelkerke R <sup>2</sup>	AUC (95% CI) of predicted probabilities
Solidity (%)	-0.326	0.722 (0.577, 0.903)	0.004			Specificity: 0.932
Torsion (degree)	2.102	8.183 (4.362, 15.352)	<0.0005			
C67	-2.805	0.06 (0.022, 0.165)	<0.0005			
Model 5				<0.0005	0.748	0.95 (0.931, 0.97)
Constant	56.316		<0.0005			
CR (%)	-0.289	0.749 (0.695, 0.807)	<0.0005			Cut-off: 0.569
CSA (mm <sup>2</sup> )	-0.110	0.896 (0.856, 0.938)	<0.0005			Sensitivity: 0.784
Solidity (%)	-0.382	0.682 (0.537, 0.867)	0.002			Specificity: 0.886
Torsion (degree)	2.248	9.467 (4.693, 19.096)	<0.0005			
C67	-2.870	0.057 (0.02, 0.162)	<0.0005			
Model 6				<0.0005	0.747	0.949 (0.929, 0.969)
Constant	64.598		<0.0005			
CR (%)	-0.271	0.763 (0.709, 0.821)	<0.0005			Cut-off: 0.486
CSA (mm <sup>2</sup> )	-0.126	0.881 (0.842, 0.923)	<0.0005			Sensitivity: 0.833
Solidity (%)	-0.465	0.628 (0.49, 0.805)	<0.0005			Specificity: 0.909
Torsion (degree)	2.028	7.602 (4.013, 14.402)	<0.0005			
C67	-2.825	0.059 (0.021, 0.164)	<0.0005			

### Compression detection including levels without compression in SCC group

The results are summarized in *Table S-6*. Importantly, the variables in *Table S6* are analogous to *Table 3* in the main text, even though not all variables were significant and some of them did not remain after backward stepwise removal of factors. In particular, CSA was not significant at levels C3/4 and C4/5, solidity was not significant at C3/4 and C6/7 and further, height was significant at level C5/6, although the OR was very close to 1 (OR =1.031 with 95% CI: 1.008–1.055). Also presented are two pooled models, one analogous to the pooled model in the main text and the second with the addition of another variable – level C3/4, which proved significant at OR = 0.262.

**Table S6** The models are constructed from parameters with angle correction, over 24 compressions and 160 non-compressions at level C3/4, 65 compressions and 119 non-compressions at level C4/5, 89 compressions and 95 non-compressions at level C5/6, 42 compressions and 142 non-compressions at level C6/7 and 220 compressions and 516 non-compressions in pooled models

	Coefficients	OR (95% CI)	p-value (factors)	p-value (model)	Nagelkerke R <sup>2</sup>	AUC (95% CI) of predicted probabilities
C3/4				<0.0005	0.550	0.915 (0.860, 0.970)
Constant	38.357		0.017			
CR (%)	-0.211	0.81 (0.712, 0.921)	0.001			
CSA (mm <sup>2</sup> )	-0.040	0.961 (0.886, 1.042)	0.335			
Solidity (%)	-0.296	0.744 (0.52, 1.064)	0.105			
Torsion (degree)	1.166	3.208 (1.436, 7.167)	0.004			

**Table S6** (continued)

Table S6 (continued)

	Coefficients	OR (95% CI)	p-value (factors)	p-value (model)	Nagelkerke R <sup>2</sup>	AUC (95% CI) of predicted probabilities
C4/5				<0.0005	0.494	0.868 (0.815, 0.921)
Constant	33.392		0.003			
CR (%)	-0.197	0.821 (0.753, 0.896)	<0.0005			
CSA (mm <sup>2</sup> )	-0.024	0.976 (0.933, 1.021)	0.286			
Solidity (%)	-0.252	0.777 (0.612, 0.987)	0.039			
Torsion (degree)	1.413	4.109 (1.897, 8.899)	<0.0005			
C5/6				<0.0005	0.545	0.888 (0.840, 0.935)
Constant	38.425		0.002			
CR (%)	-0.134	0.875 (0.808, 0.947)	0.001			
CSA (mm <sup>2</sup> )	-0.059	0.943 (0.903, 0.984)	0.008			
Solidity (%)	-0.316	0.729 (0.558, 0.954)	0.021			
Torsion (degree)	1.651	5.211 (2.406, 11.285)	<0.0005			
C6/7				<0.0005	0.558	0.913 (0.869, 0.957)
Constant	32.639		0.046			
CR (%)	-0.231	0.794 (0.721, 0.874)	<0.0005			
CSA (mm <sup>2</sup> )	-0.114	0.892 (0.836, 0.952)	0.001			
Solidity (%)	-0.188	0.829 (0.590, 1.164)	0.279			
Torsion (degree)	1.253	3.502 (1.879, 6.530)	<0.0005			
Pooled model (analogous)				<0.0005	0.551	0.896 (0.872, 0.920)
Constant	34.947		<0.0005			
CR (%)	-0.198	0.820 (0.784, 0.858)	<0.0005			
CSA (mm <sup>2</sup> )	-0.049	0.952 (0.928, 0.976)	<0.0005			
Solidity (%)	-0.252	0.778 (0.678, 0.892)	<0.0005			
Torsion (degree)	1.309	3.702 (2.609, 5.254)	<0.0005			
Level C6/7	-1.584	0.205 (0.114, 0.370)	<0.0005			
Pooled model (with C3/4)				<0.0005	0.573	0.904 (0.881, 0.926)
Constant	35.589		<0.0005			
CR (%)	-0.182	0.833 (0.796, 0.872)	<0.0005			
CSA (mm <sup>2</sup> )	-0.055	0.947 (0.923, 0.971)	<0.0005			
Solidity (%)	-0.259	0.772 (0.670, 0.888)	<0.0005			
Torsion (degree)	1.280	3.595 (2.549, 5.072)	<0.0005			
Level C3/4	-1.341	0.262 (0.136, 0.502)	<0.0005			
Level C6/7	-1.917	0.147 (0.080, 0.272)	<0.0005			

#Analysis of DCM group



## Analysis of DCM group

**Table S7** Analysis of levels with compression in asymptomatic (NMDC) and symptomatic (DCM) participants for parameters extracted with SCT with angle correction

	NMDC	DCM	P value (MW-test)	AUC (95% CI)
CR (%)				
C3/4	47.0±5.8	42.4±7.4	0.214	0.684 (0.402, 0.966)
C4/5	45.6±5.8	46.0±11.4	0.344	0.405 (0.191, 0.620)
C5/6	46.4±6.5	44.4±6.2	0.335	0.584 (0.432, 0.736)
C6/7	46.3±5.6	50.7±3.7	0.136	0.239 (0.029, 0.449)
CSA (mm <sup>2</sup> )				
C3/4	62.7±7.8	47.1±13.7	0.017*	0.853 (0.653, 1.000)
C4/5	65.5±10.1	58.0±7.1	0.011*	0.753 (0.613, 0.892)
C5/6	61.6±10.8	55.1±8.5	0.058	0.665 (0.528, 0.802)
C6/7	53.4±8.2	53.0±9.8	0.942	0.513 (0.128, 0.898)
Solidity (%)				
C3/4	94.4±2.6	91.9±2.8	0.082	0.758 (0.502, 1.000)
C4/5	93.9±3.2	94.8±2.2	0.456	0.425 (0.243, 0.608)
C5/6	93.6±3.7	94.6±1.4	0.754	0.473 (0.338, 0.607)
C6/7	94.5±2.9	93.9±2.2	0.574	0.598 (0.271, 0.926)
Torsion (degree)				
C3/4	1.7±1.1	1.8±0.9	0.836	0.537 (0.265, 0.809)
C4/5	1.7±2.8	1.3±0.6	0.785	0.473 (0.284, 0.662)
C5/6	1.5±0.7	1.4±0.6	0.515	0.443 (0.262, 0.624)
C6/7	2.0±1.0	2.8±1.5	0.272	0.692 (0.294, 1.000)
Predicted probability				
C3/4	0.965 (0.068, 1.000)	0.997 (0.698, 1.000)	0.095	0.747 (0.513, 0.982)
C4/5	0.901 (0.074, 1.000)	0.866 (0.484, 1.000)	0.757	0.469 (0.280, 0.659)
C5/6	0.963 (0.220, 1.000)	0.981 (0.764, 1.000)	0.546	0.553 (0.410, 0.696)
C6/7	0.898 (0.220, 1.000)	0.968 (0.709, 0.968)	0.510	0.615 (0.308, 0.923)

Data are presented as mean ± SD where normally distributed, median (5th–95th percentile) for data without normal distribution. The values for NMDC group are calculated from 19 compressions at C3/4 level, 55 at C4/5 level, 76 at C5/6 level and 39 at C6/7 level. The values for DCM group are calculated from 5 compressions at C3/4 level, 10 at C4/5 level, 13 at C5/6 level and 3 at C6/7 level. Mann-Whitney test was used to compare NMDC and DCM groups (because of the small number of observations in each group). ROC analysis was performed to analyse the ability of quantitative parameters and predicted probability to distinguish between compressions in NMDC and DCM group. AUC, area under curve; CI, confidence interval; RL, right-left diameter; AP, anterior-posterior diameter; CR, compressive ratio; CSA, cross-sectional area. \*P<0.05.

## Inter-trial variability of morphometric parameters divided into HC and SCC

**Table S8** Differences in morphometric parameters between the two MRI examinations in HC and SCC

HC	SCT (n=35)	SCT (with correction)	Rater 1	Rater 2	Rater 3
RL (mm)					
C3/4	0.50 (-0.45, 0.93)	0.47 (-0.45, 0.93)	1.20 (0.38, 1.88)	0.36 (-0.49, 1.29)	0.83 (-0.23, 1.64)
C4/5	0.52 (-0.58, 1.07)	0.47 (-0.56, 1.02)	1.00 (0.28, 1.54)	0.24 (-0.56, 1.06)	0.70 (-0.46, 2.01)
C5/6	0.45 (-0.17, 1.03)	0.42 (-0.16, 1.01)	0.90 (0.20, 1.76)	0.30 (-0.63, 0.98)	0.62 (-0.43, 3.21)
C6/7	0.44 (-0.18, 1.3)	0.45 (-0.18, 1.29)	0.80 (-0.26, 2.88)	0.18 (-0.65, 0.91)	0.60 (-0.46, 4.13)
ICC	0.884 (0.321, 0.960)	0.886 (0.321, 0.961)	0.620 (-0.081, 0.870)	0.873 (0.745, 0.928)	0.569 (0.110, 0.776)
AP (mm)					
C3/4	0.58 (-0.29, 1.05)	0.59 (-0.28, 1.07)	1.30 (0.30, 2.04)	0.5 (-0.51, 1.07)	0.83 (-0.27, 2.10)
C4/5	0.28 (-0.26, 0.91)	0.32 (-0.28, 0.92)	1.30 (0.60, 1.92)	0.45 (-0.33, 1.27)	1.00 (0.42, 2.17)
C5/6	0.35 (-0.40, 1.01)	0.31 (-0.40, 0.98)	1.20 (0.66, 2.00)	0.51 (-0.27, 1.25)	0.78 (0.05, 1.80)
C6/7	0.51 (-0.19, 1.35)	0.44 (-0.23, 0.97)	1.10 (0.40, 2.20)	0.53 (-0.71, 1.35)	0.79 (0.13, 3.04)
ICC	0.685 (0.078, 0.867)	0.721 (0.130, 0.878)	0.273 (-0.049, 0.633)	0.613 (0.104, 0.813)	0.332 (-0.099, 0.644)
CR (%)					
C3/4	2.66 (-4.10, 6.23)	2.68 (-3.58, 5.77)	5.95 (0.49, 10.56)	1.49 (-4.23, 5.45)	2.68 (-3.53, 13.08)
C4/5	0.86 (-6.21, 4.25)	0.84 (-6.57, 4.24)	6.72 (1.15, 11.43)	2.86 (-2.94, 7.07)	4.58 (-0.62, 17.29)
C5/6	0.75 (-5.53, 6.68)	0.66 (-5.62, 6.45)	5.58 (2.09, 10.60)	3.24 (-3.66, 8.71)	3.38 (-4.00, 14.83)
C6/7	2.03 (-3.80, 10.65)	1.12 (-4.49, 7.21)	7.09 (-0.46, 15.33)	3.02 (-3.76, 12.56)	3.98 (-7.85, 20.41)
ICC	0.827 (0.734, 0.884)	0.841 (0.767, 0.890)	0.538 (-0.088, 0.826)	0.775 (0.481, 0.884)	0.565 (0.206, 0.749)
CSA (mm <sup>2</sup> )					
C3/4	7.8 (-5.5, 13.8)	8.4 (-5.6, 14.0)	15.0 (8.0, 29.0)	5.0 (-4.0, 16.0)	13.0 (1.4, 23.8)
C4/5	6.0 (-5.5, 13.3)	6.3 (-5.5, 13.2)	16.0 (4.6, 22.4)	6.0 (-4.2, 16.0)	14.0 (5.8, 30.2)
C5/6	5.9 (-3.4, 13.0)	5.8 (-3.7, 12.8)	14.0 (5.0, 24.4)	5.0 (-2.4, 16.4)	12.0 (5.8, 30.0)
C6/7	7.7 (-3.0, 14.0)	6.0 (-2.1, 12.8)	13.0 (3.0, 35.7)	5.0 (-8.8, 14.6)	13.0 (4.6, 52.9)
ICC	0.757 (0.004, 0.916)	0.778 (0.048, 0.922)	0.347 (-0.076, 0.694)	0.713 (0.246, 0.867)	0.319 (-0.098, 0.640)
Solidity (%)					
C3/4	-0.06 (-3.20, 3.27)	-0.15 (-3.30, 2.30)			
C4/5	-0.32 (-3.99, 1.51)	-0.52 (-3.90, 1.98)			
C5/6	-0.75 (-3.50, 2.45)	-0.94 (-3.48, 2.48)			
C6/7	-0.15 (-3.93, 3.61)	-0.35 (-4.00, 3.28)			
ICC	-0.040 (-0.121, 0.200)	0.005 (-0.151, 0.163)			
SCC n=30					
RL (mm)					
C3/4	0.52 (-0.34, 1.62)	0.53 (-0.37, 1.65)	0.90 (0.21, 1.65)	0.32 (-1.02, 0.88)	0.58 (-0.12, 1.71)

**Table S8** (continued)

Table S8 (continued)

HC	SCT (n=35)	SCT (with correction)	Rater 1	Rater 2	Rater 3
C4/5	0.75 (0.02, 2.00)	0.75 (0.03, 2.01)	1.00 (0.36, 2.23)	0.36 (-0.85, 1.55)	0.45 (-0.55, 3.10)
C5/6	0.51 (-1.05, 2.05)	0.51 (-1.05, 2.05)	0.45 (-2.54, 1.74)	-0.09 (-4.08, 1.46)	0.61 (-1.07, 1.88)
C6/7	0.65 (-0.38, 1.62)	0.63 (-0.38, 1.60)	0.80 (-0.29, 1.55)	0.28 (-1.03, 1.37)	0.53 (-2.12, 1.96)
ICC	0.781 (0.194, 0.914)	0.781 (0.193, 0.914)	0.699 (0.057, 0.879)	0.749 (0.658, 0.819)	0.683 (0.420, 0.815)
AP (mm)					
C3/4	0.60 (-0.46, 1.36)	0.54 (-0.48, 1.36)	1.45 (0.66, 2.2)	0.66 (-0.96, 1.68)	0.48 (-0.37, 1.66)
C4/5	0.25 (-0.23, 1.51)	0.22 (-0.22, 1.49)	1.05 (0.40, 2.13)	0.67 (-0.40, 1.35)	0.64 (-0.89, 1.68)
C5/6	0.38 (-0.28, 1.03)	0.35 (-0.28, 1.02)	0.90 (-0.45, 1.89)	0.07 (-1.56, 1.34)	0.45 (-1.85, 1.80)
C6/7	0.28 (-0.17, 1.62)	0.35 (-0.16, 1.38)	0.85 (0.01, 2.48)	0.27 (-0.54, 1.32)	0.42 (-1.27, 2.16)
ICC	0.659 (0.153, 0.841)	0.660 (0.140, 0.843)	0.388 (-0.085, 0.726)	0.669 (0.400, 0.806)	0.537 (0.281, 0.698)
CR (%)					
C3/4	1.69 (-5.65, 9.33)	1.48 (-5.55, 8.88)	7.48 (2.36, 13.18)	4.13 (-6.13, 11.27)	1.41 (-5.19, 9.87)
C4/5	0.21 (-6.38, 6.91)	0.13 (-6.38, 6.86)	4.58 (-0.92, 12.1)	3.19 (-4.34, 11.53)	0.01 (-6.25, 9.06)
C5/6	0.04 (-9.53, 7.91)	0.51 (-9.26, 8.00)	5.31 (-0.64, 13.41)	1.27 (-7.79, 11.25)	2.18 (-11.15, 12.19)
C6/7	-0.52 (-4.1, 10.39)	-0.42 (-4.08, 9.3)	6.75 (-2.63, 14.41)	1.47 (-5.69, 7.38)	0.59 (-6.37, 14.05)
ICC	0.819 (0.749, 0.871)	0.824 (0.756, 0.875)	0.650 (-0.071, 0.874)	0.802 (0.637, 0.883)	0.760 (0.667, 0.829)
CSA (mm <sup>2</sup> )					
C3/4	9.2 (-6.5, 18.6)	8.0 (-6.4, 18.8)	16.0 (6.0, 23.5)	2.5 (-6.9, 11.5)	9.0 (-4.9, 21.3)
C4/5	6.4 (-2.1, 22.6)	6.6 (-2.2, 22.0)	12.5 (3.6, 29.5)	2.5 (-9.8, 13.5)	6.5 (-15.1, 33.3)
C5/6	7.5 (-5.1, 14.4)	7.0 (-5.0, 14.3)	10.5 (-4.5, 19.5)	0.5 (-27.1, 8.5)	4.5 (-16.4, 22.7)
C6/7	7.0 (-0.8, 19.5)	6.8 (-0.4, 17.6)	11.0 (-1.4, 24.3)	-3.5 (-12.5, 14.5)	4.5 (-20.1, 24.9)
ICC	0.636 (-0.006, 0.850)	0.639 (-0.009, 0.852)	0.381 (-0.097, 0.707)	0.691 (0.585, 0.774)	0.475 (0.241, 0.640)
Solidity (%)					
C3/4	-1.28 (-6.13, 1.72)	-1.41 (-6.11, 1.18)			
C4/5	-0.55 (-5.69, 1.82)	-0.59 (-5.72, 1.49)			
C5/6	-0.81 (-5.18, 2.81)	-0.61 (-4.87, 2.12)			
C6/7	-1.65 (-5.58, 2.66)	-1.55 (-4.98, 2.48)			
ICC	0.604 (0.379, 0.743)	0.623 (0.359, 0.769)			

Data are summarized as median (5th–95th percentile). ICCs (two-way random, absolute agreement, single measures) with 95% CI, comparing each parameter pooled per all intervertebral levels between the two MRI examinations ( $p < 0.0005$ ).

## Inter-trial and inter-rater variability of morphometric parameters (correlation matrices)

**Table S9** Correlation matrices (Pearson correlation coefficients) of CR and CSA across all raters and SCT with and without angle correction

CR C3/4	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.994	0.861	0.844	0.907	0.859	0.909	0.849	0.825	0.841
SCTcor (1.5T)	0.994	1	0.872	0.859	0.905	0.870	0.907	0.862	0.825	0.849
SCT (3T)	0.861	0.872	1	0.992	0.837	0.855	0.850	0.843	0.738	0.872
SCTcor (3T)	0.844	0.859	0.992	1	0.835	0.843	0.839	0.824	0.732	0.860
Rater1 (1.5T)	0.907	0.905	0.837	0.835	1	0.885	0.921	0.843	0.862	0.836
Rater1 (3T)	0.859	0.870	0.855	0.843	0.885	1	0.876	0.912	0.792	0.932
Rater2 (1.5T)	0.909	0.907	0.850	0.839	0.921	0.876	1	0.840	0.779	0.815
Rater2 (3T)	0.849	0.862	0.843	0.824	0.843	0.912	0.840	1	0.792	0.914
Rater3 (1.5T)	0.825	0.825	0.738	0.732	0.862	0.792	0.779	0.792	1	0.773
Rater3 (3T)	0.841	0.849	0.872	0.860	0.836	0.932	0.815	0.914	0.773	1
CSA C3/4	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.997	0.808	0.805	0.851	0.776	0.831	0.758	0.639	0.777
SCTcor (1.5T)	0.997	1	0.802	0.802	0.842	0.769	0.819	0.758	0.638	0.777
SCT (3T)	0.808	0.802	1	0.996	0.781	0.747	0.758	0.732	0.712	0.759
SCTcor (3T)	0.805	0.802	0.996	1	0.774	0.740	0.750	0.725	0.723	0.750
Rater1 (1.5T)	0.851	0.842	0.781	0.774	1	0.788	0.816	0.781	0.567	0.715
Rater1 (3T)	0.776	0.769	0.747	0.740	0.788	1	0.815	0.785	0.615	0.841
Rater2 (1.5T)	0.831	0.819	0.758	0.750	0.816	0.815	1	0.836	0.695	0.802
Rater2 (3T)	0.758	0.758	0.732	0.725	0.781	0.785	0.836	1	0.595	0.833
Rater3 (1.5T)	0.639	0.638	0.712	0.723	0.567	0.615	0.695	0.595	1	0.721
Rater3 (3T)	0.777	0.777	0.759	0.750	0.715	0.841	0.802	0.833	0.721	1
CR C4/5	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.999	0.855	0.854	0.846	0.850	0.870	0.825	0.752	0.841
SCTcor (1.5T)	0.999	1	0.853	0.853	0.849	0.847	0.869	0.825	0.758	0.837
SCT (3T)	0.855	0.853	1	0.999	0.851	0.909	0.778	0.796	0.749	0.840
SCTcor (3T)	0.854	0.853	0.999	1	0.854	0.904	0.777	0.793	0.750	0.836
Rater1 (1.5T)	0.846	0.849	0.851	0.854	1	0.874	0.826	0.794	0.825	0.791
Rater1 (3T)	0.850	0.847	0.909	0.904	0.874	1	0.837	0.851	0.782	0.887
Rater2 (1.5T)	0.870	0.869	0.778	0.777	0.826	0.837	1	0.825	0.783	0.807
Rater2 (3T)	0.825	0.825	0.796	0.793	0.794	0.851	0.825	1	0.768	0.855
Rater3 (1.5T)	0.752	0.758	0.749	0.750	0.825	0.782	0.783	0.768	1	0.672
Rater3 (3T)	0.841	0.837	0.840	0.836	0.791	0.887	0.807	0.855	0.672	1

**Table S9** (continued)

**Table S9** (continued)

CSA C4/5	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.999	0.847	0.841	0.809	0.783	0.822	0.763	0.700	0.767
SCTcor (1.5T)	0.999	1	0.852	0.847	0.815	0.784	0.827	0.770	0.707	0.770
SCT (3T)	0.847	0.852	1	0.999	0.845	0.838	0.815	0.790	0.685	0.767
SCTcor (3T)	0.841	0.847	0.999	1	0.842	0.830	0.810	0.786	0.683	0.761
Rater1 (1.5T)	0.809	0.815	0.845	0.842	1	0.785	0.860	0.757	0.729	0.726
Rater1 (3T)	0.783	0.784	0.838	0.830	0.785	1	0.762	0.807	0.584	0.876
Rater2 (1.5T)	0.822	0.827	0.815	0.810	0.860	0.762	1	0.761	0.804	0.702
Rater2 (3T)	0.763	0.770	0.790	0.786	0.757	0.807	0.761	1	0.661	0.789
Rater3 (1.5T)	0.700	0.707	0.685	0.683	0.729	0.584	0.804	0.661	1	0.541
Rater3 (3T)	0.767	0.770	0.767	0.761	0.726	0.876	0.702	0.789	0.541	1
CR C5/6	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.990	0.859	0.859	0.926	0.860	0.853	0.854	0.720	0.858
SCTcor (1.5T)	0.990	1	0.868	0.869	0.922	0.869	0.835	0.850	0.699	0.866
SCT (3T)	0.859	0.868	1	0.999	0.856	0.817	0.797	0.818	0.733	0.859
SCTcor (3T)	0.859	0.869	0.999	1	0.854	0.816	0.792	0.813	0.729	0.858
Rater1 (1.5T)	0.926	0.922	0.856	0.854	1	0.899	0.905	0.853	0.772	0.854
Rater1 (3T)	0.860	0.869	0.817	0.816	0.899	1	0.852	0.873	0.770	0.884
Rater2 (1.5T)	0.853	0.835	0.797	0.792	0.905	0.852	1	0.839	0.868	0.822
Rater2 (3T)	0.854	0.850	0.818	0.813	0.853	0.873	0.839	1	0.732	0.903
Rater3 (1.5T)	0.720	0.699	0.733	0.729	0.772	0.770	0.868	0.732	1	0.719
Rater3 (3T)	0.858	0.866	0.859	0.858	0.854	0.884	0.822	0.903	0.719	1
CSA C5/6	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.994	0.876	0.876	0.854	0.758	0.880	0.675	0.636	0.682
SCTcor (1.5T)	0.994	1	0.871	0.871	0.834	0.765	0.865	0.672	0.622	0.687
SCT (3T)	0.876	0.871	1	0.999	0.829	0.812	0.765	0.729	0.628	0.700
SCTcor (3T)	0.876	0.871	0.999	1	0.829	0.812	0.762	0.727	0.624	0.696
Rater1 (1.5T)	0.854	0.834	0.829	0.829	1	0.766	0.800	0.784	0.635	0.710
Rater1 (3T)	0.758	0.765	0.812	0.812	0.766	1	0.617	0.776	0.572	0.802
Rater2 (1.5T)	0.880	0.865	0.765	0.762	0.800	0.617	1	0.619	0.666	0.567
Rater2 (3T)	0.675	0.672	0.729	0.727	0.784	0.776	0.619	1	0.669	0.818
Rater3 (1.5T)	0.636	0.622	0.628	0.624	0.635	0.572	0.666	0.669	1	0.603
Rater3 (3T)	0.682	0.687	0.700	0.696	0.710	0.802	0.567	0.818	0.603	1

**Table S9** (continued)

Table S9 (continued)

CR C6/7	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.955	0.853	0.823	0.901	0.839	0.805	0.809	0.879	0.798
SCTcor (1.5T)	0.955	1	0.861	0.863	0.881	0.873	0.803	0.834	0.806	0.808
SCT (3T)	0.853	0.861	1	0.982	0.835	0.896	0.795	0.844	0.795	0.858
SCTcor (3T)	0.823	0.863	0.982	1	0.814	0.874	0.785	0.818	0.755	0.808
Rater1 (1.5T)	0.901	0.881	0.835	0.814	1	0.830	0.829	0.810	0.826	0.777
Rater1 (3T)	0.839	0.873	0.896	0.874	0.830	1	0.824	0.905	0.783	0.864
Rater2 (1.5T)	0.805	0.803	0.795	0.785	0.829	0.824	1	0.858	0.801	0.791
Rater2 (3T)	0.809	0.834	0.844	0.818	0.810	0.905	0.858	1	0.808	0.881
Rater3 (1.5T)	0.879	0.806	0.795	0.755	0.826	0.783	0.801	0.808	1	0.725
Rater3 (3T)	0.798	0.808	0.858	0.808	0.777	0.864	0.791	0.881	0.725	1
CSA C6/7	SCT (1.5T)	SCTcor (1.5T)	SCT (3T)	SCTcor (3T)	Rater1 (1.5T)	Rater1 (3T)	Rater2 (1.5T)	Rater2 (3T)	Rater3 (1.5T)	Rater3 (3T)
SCT (1.5T)	1	0.963	0.876	0.874	0.856	0.619	0.870	0.800	0.729	0.723
SCTcor (1.5T)	0.963	1	0.866	0.881	0.790	0.625	0.856	0.793	0.615	0.738
SCT (3T)	0.876	0.866	1	0.989	0.804	0.686	0.753	0.796	0.581	0.743
SCTcor (3T)	0.874	0.881	0.989	1	0.768	0.677	0.748	0.776	0.565	0.719
Rater1 (1.5T)	0.856	0.790	0.804	0.768	1	0.621	0.827	0.742	0.724	0.665
Rater1 (3T)	0.619	0.625	0.686	0.677	0.621	1	0.524	0.660	0.370	0.675
Rater2 (1.5T)	0.870	0.856	0.753	0.748	0.827	0.524	1	0.773	0.751	0.668
Rater2 (3T)	0.800	0.793	0.796	0.776	0.742	0.660	0.773	1	0.572	0.829
Rater3 (1.5T)	0.729	0.615	0.581	0.565	0.724	0.370	0.751	0.572	1	0.446
Rater3 (3T)	0.723	0.738	0.743	0.719	0.665	0.675	0.668	0.829	0.446	1