CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Can microstructural MRI detect subclinical tissue injury in subjects with asymptomatic cervical spinal cord compression? A prospective cohort study
Authors	Martin, Allan R.;De Leener, Benjamin;Cohen-Adad, Julien;Cadotte, David W.;Nouri, Aria;Wilson, Jefferson R.;Tetreault, Lindsay A.;Crawley, Adrian P.;Mikulis, David J.;Ginsberg, Howard;Fehlings, Michael G.
Publication date	2018
Original Citation	Martin, A. R., De Leener, B., Cohen-Adad, J., Cadotte, D. W., Nouri, A., Wilson, J. R., Tetreault, L., Crawley, A. P., Mikulis, D. J., Ginsberg, H. and Fehlings, M. G. (2018) 'Can microstructural MRI detect subclinical tissue injury in subjects with asymptomatic cervical spinal cord compression? A prospective cohort study', BMJ Open, 8(4), e019809 (11pp). doi: 10.1136/bmjopen-2017-019809
Type of publication	Article (peer-reviewed)
Link to publisher's version	http://bmjopen.bmj.com/content/8/4/e019809 - 10.1136/bmjopen-2017-019809
Rights	© 2018, Article author(s) (or their employer(s) unless otherwise stated in the text of the article). All rights reserved. No commercial use is permitted unless otherwise expressly granted. This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. - https://creativecommons.org/licenses/by-nc/4.0/
Download date	2026-11-15 12:46:11
Item downloaded from	https://hdl.handle.net/10468/6221



University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Supplemental Tables

Supplemental Table 1: Anatomical Features of Spinal Cord Compression and Quantitative Shape Metrics. MRI images were analyzed for degenerative changes causing cervical spinal cord compression, defined as indentation, flattening, or focal torsion. Levels with cord compression are listed, and a description of the degenerative changes and morphology of cord compression are provided. * denotes an abnormal value of CR, solidity, or RR. ASCC: asymptomatic spinal cord compression, CR: compression ratio, DOC: disc ± osteophyte complex, LF: ligamentum flavum, MCL: maximally compressed level, RR: relative rotation, Sol.: solidity.

#	Age, Sex	MCL	Comp. Levels	CR (%)	Sol. (%)	RR (°)	MRI Features
1	74M	C5-6	C4-5	51.5*	95.8	-1.4	Broad DOC flattening cord
			C5-6	49.3*	96.4	0.3	Broad DOC flattening cord
			C6-7	48.6*	95.2	-2.3	Lateral DOC flattening and rotating cord
2	55F	C3-4	C3-4	53.1*	93.9*	-1.0	Central DOC indenting and flattening cord, mild LF hypertrophy
			C4-5	51.7*	94.6*	-0.7	Central DOC indenting and flattening cord, mild LF hypertrophy
3	59F	C5-6	C3-4	47.8*	95.3*	1.3	Broad DOC flattening and indenting cord
			C4-5	48.5*	96.1	0.5	Broad DOC flattening cord
			C5-6	45.6*	98.2	0.5	Broad DOC flattening cord
4	28M	C4-5	C3-4	57.8	95.4*	-1.2	Central DOC indenting cord
			C4-5	53.4	94.4*	-1.0	Central DOC indenting cord
			C5-6	51.7	95.4*	-1.4	Central DOC indenting cord
5	30M	C5-6	C5-6	55.4	94.6*	2.1	Central DOC indenting cord
			C6-7	53.9	93.9*	2.1	Central DOC indenting cord
6	52F	C4-5	C3-4	56.4	94.3*	-1.8	Central DOC indenting cord, mild LF hypertrophy at C3-4, C4-5
			C4-5	60.8	92.7*	-2.9	Central DOC indenting cord, mild LF hypertrophy
			C5-6	61.1	95.4*	-7.0*	Lateral DOC indenting and rotating cord
			C6-7	48.6*	93.8*	1.0	Central DOC indenting and flattening cord
7	60F	C5-6	C5-6	50.4*	95.4*	0.7	Broad DOC flattening cord
8	69M	C5-6	C5-6	48.9*	97.5	-0.7	Broad DOC flattening cord
			C6-7	49.0*	95.8	2.5	Broad DOC flattening cord
9	66F	C4-5	C4-5	55.4	94.2*	0.0	Central DOC indenting cord, mild LF hypertrophy
10	51M	C6-7	C6-7	43.4*	91.6*	-0.9	Central DOC indenting and flattening cord
11	39M	C6-7	C6-7	55.4	94.7*	4.5*	Lateral DOC indenting and rotating cord
12	49M	C6-7	C4-5	55.2	93.7*	-0.2	Central DOC indenting cord
			C5-6	49.5*	95.8	2.1	Broad DOC flattening cord
			C6-7	46.1*	92.9*	-5.0*	Lateral DOC indenting, flattening, and rotating cord
13	50F	C5-6	C4-5	55.5	94.1*	0.5	Central DOC indenting cord
			C5-6	55.0	95.3*	-4.2*	Broad lateral DOC indenting and rotating cord
14	51F	C4-5	C3-4	55.8	95.4*	-0.8	Central DOC indenting cord
			C4-5	54.0	93.0*	1.9	Central DOC indenting cord
			C5-6	54.3	95.6	0.6	Central DOC indenting cord
15	55F	C4-5	C3-4	46.9*	96.2	0.8	Broad DOC flattening cord
			C4-5	41.3*	95.4*	0.6	Central DOC indenting cord
			C5-6	42.0*	96.0	-0.4	Broad DOC flattening cord
16	79F	C5-6	C4-5	52.3	95.5*	-1.3	Central DOC indenting cord
			C5-6	46.7*	93.3*	-2.0	Central DOC indenting and flattening cord
17	77M	C5-6	C3-4	53.2*	92.8*	-4.0*	Lateral DOC indenting and rotating cord
			C4-5	48.6*	95.8	-0.4	Broad central DOC flattening cord

			C5-6	48.3*	93.9*	-2.9*	Broad DOC indenting, flattening, and rotating cord
18	44M	C5-6	C3-4	55.6	94.9*	-0.7	Central DOC indenting cord
			C4-5	55.7	95.1*	1.4	Central DOC indenting cord
			C5-6	45.4*	93.4*	0.0	Central DOC indenting and flattening cord, mild LF hypertrophy
19	56M	C5-6	C5-6	53.6	94.8*	-1.3	Circumferential compression, flattening from broad DOC and LF hypertrophy
20	54M	C6-7	C4-5	51.5	95.3*	0.1	Central DOC indenting cord
			C6-7	46.6*	96.7	-2.4*	Broad DOC flattening and rotating cord

Supplemental Table 2: Variations of MRI Measures with Subject Characteristics. The relationship between MRI metrics and subject characteristics (age, sex, height, weight, and cervical cord length) were analyzed with backward stepwise multiple linear regression that also included a binary independent variable for the presence of cord compression. Age was retained in each model regardless of significance, and linear coefficients for age and any other significant relationships (CSA with cervical cord length and MTR with height) were subsequently used to normalize MRI metrics.

Region	MRI Metric	Age	Sex	Height	Weight	Cervical Cord Length
Rostral (C1-C3)	CSA	β=-0.168 (p=0.10)	-	-	-	β=4.81 (p=0.002)
	FA	$\beta=-6.06\times10^{-4}$ (p=0.19)	-	-	-	-
	MTR	β=-0.0472 (p=0.13)	-	β=-0.181 (p=0.0004)	-	-
	T2*WI WM/GM	$\beta=2.34\times10^{-4}$ (p=0.53)	-	-	-	-
MCL or C4-5	CSA	β=-0.195 (p=0.17)	-	-	-	β=4.90 (p=0.02)
	FA	$\beta=-7.16\times10^{-4}$ (p=0.22)	-	-	-	-
	MTR	β=-0.0545 (p=0.15)	-	β=-0.146 (p=0.01)	-	-
	T2*WI WM/GM	$\beta=3.39\times10^{-5}$ (p=0.91)	-	-	-	-
Caudal (C6-C7)	FA	β=-0.00127 (p=0.12)	-	-	-	-
	T2*WI WM/GM	$\beta=1.20\times10^{-4}$ (p=0.83)	-	-	-	-