

Short communication

P 124 - Normative data to assess the degree of normality in the cervical spine movement replacing the outdated AMA guidelines. Preliminary results

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ABSTRACT

Classical AMA guidelines have been used to assess the degree of normality of the cervical spine movement of individuals. Since they do not take into account the variability of ROM due to age a different approach using normative data with different age intervals is proposed.

1. Introduction

The functional issues that befall the injury are a tangible sign that can be measured to assess the grade of severity, nevertheless reference values are needed to determine what is deviant from normality. Classically this has been done using the AMA guidelines for range of motion (ROM). Losses of between 4°–6° of cervical range of motion (ROM) for each life decade [1] suggest that AMA guidelines might not be sensitive enough to grade the injury depending on the patient's age.

2. Research question

Will the staging of the cervically injured patients be improved by using reference values for each age interval?

3. Methods

Cross-sectional single-blind study on database from over 90 measuring spots across Spain with health teams trained alike. Patients sign an informed consent in all the trials made on them. The MovMe ac-

celerometry system is used for the task [2]. Evaluation before starting rehabilitation has been chosen for this project. 4 age intervals with 30 cases each are created for each decade between 20 and 59 years. Inclusion criteria for the cases are: being injured by car traffic accident and having medical diagnosis of cervical spine related injuries; exclusion criteria is having history of repeated car traffic accidents. 45 s of head movement in each plane of motion in seated position are used to gather as much repetitions as possible. The max ROM peak is used to calculate the percentage of normality of the movement using two different perspectives. The first is using the AMA cervical spine ROM guidelines, and the second one using 99% confidence intervals made with the cervical spine normative data from the study of Swinkels et al. [3]. In the second option, if the ROM is inside the confidence interval it is considered a 100%, if it falls higher or lower, the percentage of normality is calculated with the high or low bound respectively. Student's paired T tests were run for all pairs of data.

4. Results

Results are presented in Table 1.

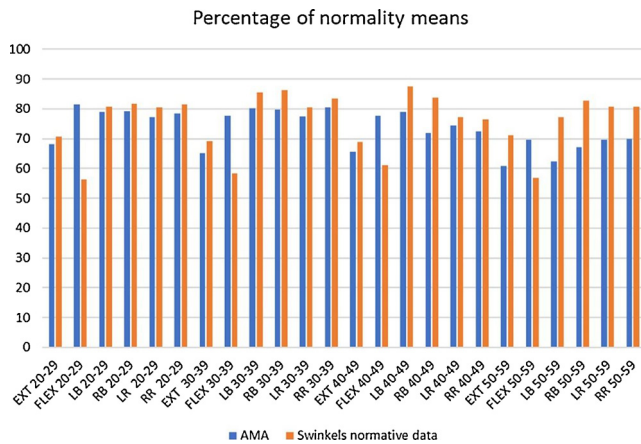
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Table 1

Mean ROM, Normality with AMA, normality with age intervals, correlation, p-values and difference between using age reference or AMA guidelines (extension: EXT; flexion: FLEX; left bendign: LB; right bending: RB; left rotation: LR; right rotation: RR).

		MEAN ROM (°)	Percentage of normality with AMA (%)	Percentage of normality according to Swinkels values (%)	Paired samples Correlation	P Value	Mean Difference (%)
20–29	EXT	40,89 ± 14,52	68,15 ± 24,21	70,59 ± 23,55	0,996	0,000*	2,44 ± 2,26
	FLEX	40,73 ± 14,98	81,46 ± 29,96	56,3 ± 20,7	1,000	0,000*	–25,15 ± 9,25
	LB	35,54 ± 6,54	78,97 ± 14,53	80,6 ± 14,78	1,000	0,000*	1,62 ± 0,34
	RB	35,61 ± 8,64	79,13 ± 19,2	81,63 ± 17,65	0,992	0,000*	2,50 ± 2,83
	LR	61,69 ± 13,4	77,12 ± 16,75	80,57 ± 16,41	0,997	0,000*	3,45 ± 1,33
	RR	62,80 ± 16,39	78,5 ± 20,49	81,51 ± 20,33	0,998	0,000*	3,01 ± 1,4
30–39	EXT	39,02 ± 16,03	65,03 ± 26,72	69,06 ± 27,11	0,997	0,000*	4,03 ± 2,2
	FLEX	38,87 ± 15,95	77,74 ± 31,91	58,38 ± 23,67	1,000	0,000*	–19,35 ± 8,28
	LB	36,05 ± 7,67	80,11 ± 17,04	85,6 ± 16,11	0,993	0,000*	5,48 ± 2,14
	RB	35,85 ± 9,12	79,68 ± 20,28	86,22 ± 19,31	0,991	0,000*	6,54 ± 2,89
	LR	61,95 ± 13,36	77,43 ± 16,7	80,33 ± 16,71	0,997	0,000*	2,89 ± 1,38
	RR	64,41 ± 13,4	80,51 ± 16,75	83,37 ± 16,67	0,997	0,000*	2,85 ± 1,36
40–49	EXT	39,35 ± 11,68	65,59 ± 19,47	68,88 ± 19,91	,998	0,000*	3,29 ± 1,38
	FLEX	38,80 ± 13,39	77,6 ± 26,79	61,1 ± 21,1	1,000	0,000*	–16,49 ± 5,69
	LB	35,53 ± 8,65	78,96 ± 19,23	87,54 ± 18,5	0,988	0,000*	8,57 ± 3,05
	RB	32,32 ± 8	71,83 ± 17,79	83,77 ± 19,03	0,989	0,000*	11,93 ± 2,99
	LR	59,47 ± 19,09	74,34 ± 23,87	77,29 ± 24,46	0,999	0,000*	2,95 ± 1,4
	RR	57,93 ± 16	72,41 ± 20	76,32 ± 20,63	0,998	0,000*	3,90 ± 1,53
50–59	EXT	36,43 ± 12,55	60,71 ± 20,92	71,04 ± 23,04	0,995	0,000*	10,33 ± 2,99
	FLEX	34,80 ± 11,51	69,6 ± 23,03	56,72 ± 18,77	1,000	0,000*	–12,87 ± 4,26
	LB	28,03 ± 8,67	62,3 ± 19,28	77,14 ± 22,6	0,993	0,000*	14,84 ± 4,18
	RB	30,24 ± 6,39	67,2 ± 14,21	82,6 ± 15,36	0,985	0,000*	15,40 ± 2,8
	LR	55,80 ± 11,83	69,75 ± 14,79	80,64 ± 16,16	0,994	0,000*	10,88 ± 2,14
	RR	55,84 ± 11,36	69,8 ± 14,2	80,61 ± 15,34	0,996	0,000*	10,81 ± 1,71

**Fig. 1.** Percentage of normality with each method.

5. Discussion

Statistically relevant differences were found for all comparisons. The most affected intervals are the later stages of life were differences can be as high as 15% (Fig. 1). This preliminary data will serve to prepare a thorough analysis to confirm these findings. With these findings we discourage the continued use of the AMA guidelines to calculate normalized movement, so the diagnosis process is improved.

References

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