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POS0952

RESPONSIVENESS OF SPINAL MOBILITY MEASUREMENTS IN AXIAL SPONDYLOARTHRITIS USING CONVENTIONAL AND ADVANCED METROLOGY: A PILOT STUDY

J. L. Garrido-Castro¹, I. C. Aranda-Valera², P. Gardiner³, P. Machado⁴, J. Condell⁵, C. Gonzalez-Navas¹, E. Collantes Estevez² On behalf of the iMaxSpA study group. ¹Maimónides Biomedical Research Institute of Córdoba, Motion Analysis Lab, Córdoba, Spain; ²Hospital Universitario Reina Sofía, Rheumatology, Córdoba, Spain; ³Western Health and Social Care Trust, Rheumatology, Londonderry, United Kingdom; ⁴University College London, Rheumatology, London, United Kingdom; ⁵Ulster University, School of Computing, Eng & Intel. Sys, Londonderry, United Kingdom

Background: Spinal mobility is an important outcome in axial spondyloarthritis (axSpA). Standardized metrology tests have been defined and validated. Nevertheless, conventional metrology measures lack responsiveness, particularly in the context of assessing short term response to treatments. Advanced metrology devices have also been used in axSpA, namely optical motion capture systems (MoCap) and Inertial Measurement Systems (IMU). These systems have better psychometric properties in terms of accuracy and reliability for analysing spinal mobility.

Objectives: To compare the responsiveness of spinal mobility using conventional and advanced metrology.

Methods: Spinal mobility was measured using an IMU based system (ViMove©) with sensors located at: occiput and T3 for cervical mobility, L1 and sacrum for lumbar mobility, and T3 and sacrum for thoracic+lumbar mobility. A MoCap system (UCOTrack©) using 13 markers was also used to record the movements in 3 planes (flexion+extension, rotation, and lateral flexion). The UCOASMI [1] index was calculated using measures obtained by MoCap and by the IMU system. Other metrology indexes based on IMU measures developed by the authors [2] were also calculated. Patients were assessed before (PRE) and 3 months after (POST) TNF blocker treatment. The Wilcoxon signed-rank test was used to test differences between pairs of pre- and post-treatment. Cohen's d was used for calculating the effect size of improvement.

Results: 12 axSpA patients were recruited from the CASTRO cohort (42% female, age 46±11 years, disease duration 16±13 years). Results PRE and POST are shown in Table 1: means (sd), statistical significance, and effect size. Disease activity and functional indexes were lower in POST and these differences were significant, especially in ASDAS. Conventional metrology lacked responsiveness, except for cervical rotation. MoCap showed moderate

responsiveness in cervical rotation, in thoracolumbar mobility and with regards to the UCOASMI. Using IMU measures, responsiveness was good in terms of cervical flexion and rotation. For Lumbar (L_L) and Lumbar Thoracic (LT_L), lateral flexion shown significant improvement and lumbar rotation shown the best responsiveness.

	PRE	POST	Sign	ES		PRE	POST	Sign	ES
<i>Activity</i>									
<i>IMU</i>									
BASDAI	6.5 (1.6)	4.9 (2.7)	*	0.64	C_FLEX	77 (22)	83 (19)	*	-0.25
BASFI	6.5 (2.3)	4.8 (3.2)	*	0.58	C_ROT	78 (25)	84 (22)	*	-0.22
ASDAS	3.6 (1.0)	2.5 (1.2)	**	0.87	C_FL	54 (19)	54 (17)	NS	
<i>Metrology</i>									
LatFlex	9.3 (4.1)	10.6 (3.3)	NS		L_FLEX	46 (16)	44 (19)	NS	
TWD	13.2 (4.2)	12.8 (3.6)	*	0.06	L_ROT	21 (9)	27 (9)	***	-0.66
Schober	4.7 (1.5)	4.9 (1.5)	NS		L_FL	32 (1)	38 (10)	*	-0.52
IMD	89 (15)	90 (15)	NS		LT_FLEX	62 (28)	63 (24)	NS	
CervRot	104 (28)	118 (24)	**	-0.51	LT_ROT	63 (19)	70 (19)	NS	
BASMI	3.8 (1.3)	3.4 (1.2)	NS		LT_FL	52 (15)	60 (15)	**	-0.51
<i>MoCap</i>									
C_FLEX	81 (22)	87 (20)	*	-0.28	Trk_FLEX	109 (28)	112 (24)	NS	
C_ROT	101 (28)	112 (25)	***	-0.38	Trk_ROT	98 (31)	116 (21)	**	-0.59
C_FL	58 (20)	58 (18)	NS		Trk_FL	39 (9)	46 (10)	**	-0.7
L_FLEX	107 (24)	114 (21)	***	-0.26	TTrk_FLEX	119 (36)	128 (30)	NS	
L_ROT	67 (21)	73 (20)	NS		TTrk_ROT	137 (34)	161 (35)	**	-0.67
L_FL	57 (18)	65 (20)	**	-0.41	iUCOASMI	5.7 (1.5)	5.0 (1.4)	***	0.48
UCOASMI	6.1 (1.6)	5.3 (1.6)	**	0.50	iUCOASMIT	6.0 (1.5)	5.4 (1.3)	**	0.39
					iCXLASMI	3.9 (1.8)	3.2 (1.5)	**	0.40
					iCLuASMI	3.2 (1.4)	2.7 (1.3)	***	0.40

NS, not significant; *, p<0.05; **, p<0.01

Conclusion: Conventional metrology lacks short-term responsiveness. Advanced metrology using MoCap and IMU showed, in this pilot study, better responsiveness compared to conventional measures. Furthermore, IMU provide a feasibility similar to conventional metrology, and could be easily implemented in the context of clinical trials and observational studies.

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POS0953

PERIPHERAL ARTHRITIS AND HIGHER DISEASE ACTIVITY LEAD TO MORE FUNCTIONAL IMPAIRMENT IN AXIAL SPONDYLOARTHRITIS: LONGITUDINAL ANALYSIS FROM ESPAXIA

D. Capelusnik¹, S. Ramiro^{2,3}, E. E. Schneeberger¹, G. Citera¹. ¹Instituto de Rehabilitación Psicosfísica, Rheumatology, CABA, Argentina; ²Leiden University Medical Centre, Rheumatology, Leiden, Netherlands; ³Zuyderland Medical Centre, Rheumatology, Heerlen, Netherlands

Background: Preserving functional ability is among the main goals when treating patients with axSpA. Higher disease activity, reduced axial mobility, and increase spinal radiographic damage, and smoking status have shown to be longitudinally associated with functional worsening. The presence of peripheral arthritis has also been associated with worse functional ability during follow-up, though not in a true longitudinal analysis.

Objectives: To investigate whether peripheral arthritis together with disease activity independently contribute to functional impairment over time in patients with axSpA and to evaluate if there are contextual factors modifying this relationship.

Methods: Patients with axSpA from the ESPAXIA cohort were followed-up annually over 7 years. Physical function was assessed by the self-reported questionnaire BASFI, disease activity by ASDAS and peripheral arthritis was also recorded. The association between BASFI (outcome), peripheral arthritis and ASDAS (main variables of interest) over time was tested in generalized estimating equations (GEE) models. Models were autoregressive, i.e. adjusted for BASFI 1 year earlier, to allow for a truly longitudinal interpretation. Interactions between each of ASDAS and peripheral arthritis with contextual factors were tested.

Results: 185 patients were included (77 % male, mean age 42 (SD 13), mean disease duration 9.4 (SD 9.6) years. Mean baseline ASDAS was 2.3 (1.4), mean BASFI

3.9 (2.7) and 17% presented peripheral arthritis during the first visit. After a mean of 3.7 (2.4) years of follow-up, ASDAS and peripheral arthritis independently contributed to explaining BASFI changes over time. Contextual factors did not modify either of the relationships. A true longitudinal relation was proved with the autoregressive GEE model, showing that, adjusted for age, gender, spinal mobility and use of NSAIDs, an increase of one ASDAS unit led to a BASFI 0.48 units higher (β 0.48 [95% CI 0.39-0.57]), and the presence of peripheral arthritis, to a BASFI 0.44 units higher (β 0.44 [0.08-0.8]) (Table 1). A gradient was found for ASDAS disease activity states: ASDAS low disease activity (vs ASDAS inactive disease) with an increase in BASFI of 0.67 (0.35-0.98) units compared to ASDAS very high disease activity (vs ASDAS inactive disease) with a BASFI increase of 2.30 (1.90-2.72) units. (Figure 1) No interaction was found between peripheral arthritis and disease activity on BASFI, and similarly, no interactions were found between either ASDAS or peripheral arthritis with age, gender, educational level, smoking status, job type or comorbidities on BASFI.

Table 1. Factors longitudinally associated with BASFI

Assessment	Model with ASDAS continuous	Model with ASDAS categorical
	β (95% CI)	β (95% CI)
	n=179	n=179
Previous BASFI (0-10)	0.47 (0.41 to 0.52) †	0.44 (0.39 to 0.50) †
Age (years)	0.007 (-0.005 to 0.02)	0.008 (-0.004 to 0.02)
Male gender (vs female gender)	-0.42 (-0.79 to -0.06) †	-0.38 (-0.74 to -0.02) †
Peripheral arthritis	0.44 (0.08 to 0.80) †	0.38 (0.03 to 0.74) †
ASDAS-CRP	0.48 (0.39 to 0.57) †	-
ASDAS-CRP categorical		
Moderate vs inactive disease	-	0.67 (0.35 to 0.98) †
High vs inactive disease	-	1.70 (1.37 to 2.02) †
Very high vs inactive disease	-	2.30 (1.90 to 2.72) †
BASMI (0-10)	0.32 (0.24 to 0.41) †	0.32 (0.23 to 0.40) †
NSAIDs (%)	0.38 (0.09 to 0.66) †	0.37 (0.09 to 0.64) †

† Significant at $p < 0.05$.

Figure 1. Longitudinal relationship between ASDAS and BASFI

Conclusion: Peripheral arthritis and higher disease activity independently lead to more functional impairment in axSpA. Contextual factors do not modify these relationships.

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POS0954

QUALITY OF LIFE IN CHRONIC BACK PAIN PATIENTS, A 2-YEAR COMPARISON BETWEEN PATIENTS WITH AND WITHOUT A DIAGNOSIS OF AXIAL SPONDYLOARTHRITIS: DATA FROM THE SPONDYLOARTHRITIS CAUGHT EARLY COHORT

A. Boel¹, M. Van Lunteren¹, K. M. Fagerli², S. Exarchou³, R. Ramonda⁴, M. Van de Sande⁵, D. Van der Heijde¹, F. A. Van Gaalen¹, ¹Leiden University

Medical Centre, Rheumatology, Leiden, Netherlands; ²Diakonhjemmet Hospital, Rheumatology, Oslo, Norway; ³Lund University, Clinical Sciences, Section of Rheumatology, Malmö, Sweden; ⁴University of Padova, Medicine, Rheumatology Unit, Padova, Italy; ⁵Amsterdam University Medical Center, Rheumatology and Clinical Immunology, Amsterdam, Netherlands

Objectives: To study quality of life (QoL) in patients with a diagnosis of axial spondyloarthritis (axSpA) and how this relates to the QoL of patients without axSpA, after two-years of protocolised follow-up.

Methods: QoL was assessed using the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). Age, sex and country weighted scale scores were calculated for each of the 8 subscales. Numeric scales ranged from 0 (worst health) to 100 (best health), after recoding and recalibration. The physical (PCS) and mental component summary (MCS) scores were calculated from the adjusted scores; and transformed to enable comparison to the general population mean of 50.

Additionally, the proportion of patients with an improvement or worsening of the PCS and MCS above the minimal clinically important difference (MCID) were assessed. We applied the commonly used MCID in clinical trials with bDMARDs in axSpA of 3 points for the PCS and MCS.

In this study we included patients from the SPACE cohort (patients aged >16 years with chronic back pain suspected of axSpA) with a diagnosis axSpA or no axSpA all with a level of confidence ≥ 7 (on a 0-10 scale) after locally read imaging. The PCS and MCS had to be available at baseline and 2-year follow-up too.

Linear regression models were used to test the difference between patients with and without axSpA at two-year follow-up for PCS and MCS scores. Baseline PCS and MCS scores and NSAID-use over time were tested as confounders.

Results: Patients with a diagnosis of axSpA were more frequently male (57% vs 27%) and HLA-B27 positive (75% vs 31%) and had more SpA features at baseline [mean (SD) 5(2) vs 3(1)] compared to the patients without axSpA. Age, symptom duration and NSAID-use were similar between groups.

In both groups the PCS significantly improved over two years. The PCS was significantly better in the group with an axSpA diagnosis compared to the no axSpA group at two-year follow-up, after correction for baseline PCS scores and NSAID-use over time (table 1). Despite the improvements over time, PCS scores were still well below the general population mean of 50 in both groups at two-year follow-up. MCS scores were not significantly different between groups at follow-up, and they were close to the general population mean.

In linear regression models with baseline values and NSAID-use over time as covariates, axSpA was an independent predictor of better PCS scores.

Table 1. PCS and MCS scores at baseline and 2-year follow-up for the group with an axSpA diagnosis and those without axSpA (no axSpA)

	Diagnosis axSpA		no axSpA		p-values between groups at 2yrs
	(N=186)		(N=74)		
	Baseline 2 years		Baseline 2 years		
SF-36 PCS, mean (SD) %	28.0 (14.8)	40.5 (12.3) [†]	26.4 (13.6)	34.7 (15.6) [†]	p<0.001*
Improvement >MCID, n(%)		143 (78)		49 (66)	
Worsening >MCID, n(%)		22 (12)		12 (16)	
SF-36 MCS, mean (SD) %	47.3 (13.7)	47.9 (11.8)	46.5 (11.2)	48.9 (10.6)	p=0.364
Improvement >MCID, n(%)		76 (42)		35 (47)	
Worsening >MCID, n(%)		69 (38)		26 (35)	

*Significant difference between groups at two years; after correction for baseline PCS scores and NSAID use over time†Significant improvement within group over timeaxSpA, axial spondyloarthritis; MCID, Minimal Clinically Important Difference; MCS, Mental Component Summary; PCS, Physical Component Summary; SF-36, Medical Outcomes Study 36-Item Short-Form Health SurveyPCS scores of the majority of patients in both groups improved more than the MCID over two-years of protocolised follow-up. The proportions of patients who improved or worsened more than the MCID in MCS scores were similar.

Conclusion: After two years of protocolised follow-up physical functioning was better in patients with an axSpA diagnosis compared to patients without axSpA, but remained significantly compromised in both groups in comparison to the general population.

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