Oral presentation2

時　間：114 年 11 月 22 日(星期六)09：05-09：35

地　點：台中林酒店 3F 環球廳　　摘要：

座長/Moderator	衛收福利部桃園醫院 曾國森醫師 大林慈濟醫院 童建學醫師
09:05-09:17	**Development of a smartphone balance evaluation application for patients with rheumatoid arthritis** Chien-Sheng Wu[1], Wen-Hsu Sung[2] [1] Far Eastern Memorial Hospital, New Taipei City, Taiwan. [2] Department of Physical Therapy and Assistive Technology, National Yang Ming Chiao Tung University, Taipei, Taiwan **運用智慧型手機軟體發展類風溼性關節炎病人平衡評估** 吳建陞[1]、宋文旭[2] [1] 亞東紀念醫院、[2] 國立陽明交通大學物理治療技暨輔助科技學系
09:17-09:20	Q & A
09:20-09:32	**Factors Associated with Spinal Radiographic Progression in Patients with Axial Spondyloarthritis: A Hospital-based Retrospective Cohort Study** Chung-Mao Kao[1, 2], Hsin-Hua Chen[1, 3*] 高宗楙[1, 2], 陳信華[1, 3*] [1] Division of Allergy, Immunology, and Rheumatology, Department of Internal Medicine, Taichung Veterans General Hospital, Taichung, Taiwan. [2] Division of Translational Medicine, Department of Medical Research, Taichung Veterans General Hospital, Taichung, Taiwan. [3] Department of Digital Medicine, Taichung Veterans General Hospital, Taichung, Taiwan. [1] 臺中榮民總醫院 內科部 過敏免疫風濕科 [2] 臺中榮民總醫院 醫學研究部 轉譯醫學研究科 [3] 臺中榮民總醫院 數位醫學部
09:32-09:35	Q & A

Development of a smartphone balance evaluation application for patients with rheumatoid arthritis

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運用智慧型手機軟體發展類風溼性關節炎病人平衡評估

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Background: Patients with rheumatoid arthritis (RA) often experience joint pain and reduced range of motion in their lower limbs, impairing daily activities like standing and walking, and increasing the risk of falls. This study explored the use of smartphones to detect balance defects in RA patients.

Methods and Materials: The study involved 33 healthy subjects and 31 RA patients. Each participant underwent the limit of stability (LOS) test using Android smartphones, which recorded triaxial acceleration and angular values through built-in accelerometers and gyroscopes, along with plantar pressure center displacement using a dynamometer. RA patients also underwent clinical balance tests, including the timed up and go test, functional reach test, Berg balance scale, and modified falls efficacy scale (MFES). The correlation between smartphone-measured balance values and clinical scores was analyzed.

Results and Discussion: RA patients performed significantly worse than healthy subjects in the timed up and go test, functional reach test, Berg balance scale, and MFES. Smartphone measurements showed that RA patients had significantly higher values for acceleration and angular velocity detected by smartphones. Correlation analysis revealed a low positive correlation between the timed up and go test and average angular velocity (GYRO-AVG) ($R = 0.277$, $P = 0.027$), and a low negative correlation between MFES and both standard deviation of acceleration (ACC-SD) and GYRO-AVG ($r = -0.292$, $p = 0.019$; $r = -0.331$, $p = 0.007$).

Conclusion: Smartphone applications, utilizing built-in triaxial accelerometers and gyroscopes, can effectively screen the balance performance of RA patients.

Keywords: rheumatoid arthritis; balance; smartphone

Factors Associated with Spinal Radiographic Progression in Patients with Axial Spondyloarthritis: A Hospital-based Retrospective Cohort Study

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Abstract

Background: To identify associated and protective factors of spinal radiographic progression in axial spondyloarthritis (axSpA).

Methods: We conducted a hospital-based retrospective cohort study including 242 axSpA patients with ≥2 lateral cervical and lumbar spine radiographs between 2000 and 2023. Spinal damage was assessed using modified Stoke Ankylosing Spondylitis Spine Score (mSASSS). Each pair of consecutive radiographs defined an observational interval (total 379 intervals); annual mSASSS progression rate was calculated for each interval. Demographics, clinical features, comorbidities, baseline mSASSS, disease activity indices, and cumulative dosage of prescriptions and laboratory recordings were collected. Time-dependent generalized estimating equations (GEE) were applied to identify independently associated or protective factors of rapid spinal radiographic progression (ΔmSASSS/year >1), accounting for within-patient correlation.

Results: For recorded intervals, mean ± standard deviation mSASSS progression was 0.5±2.3/year, and 26.7% of intervals showed progression >1/year. For enrolled patients, mSASSS progression was 0.6±2.6/year, and 27.3% of intervals showed progression >1/year **(Figure 1)**. Conditional multivariable GEE analysis revealed age at baseline mSASSS, especially ≥40 years, was independently associated with rapid mSASSS progression [adjusted odds ratio (aOR), 1.03; 95% confidence interval (CI), 1.003–1.06]. Higher cumulative dosage of non-steroidal anti-inflammatory drugs (NSAIDs) during the intervals was negatively associated with rapid mSASSS progression (aOR, 0.38; 95% CI, 0.19–0.75). Cumulative dosage of tumor necrosis factor inhibitors and secukinumab during the intervals was independent of rapid mSASSS progression **(Table 1)**.

Conclusion: We identified age at baseline mSASSS as associated factor and NSAIDs use with sufficient dosage as protective factor for rapid spinal radiographic progression.

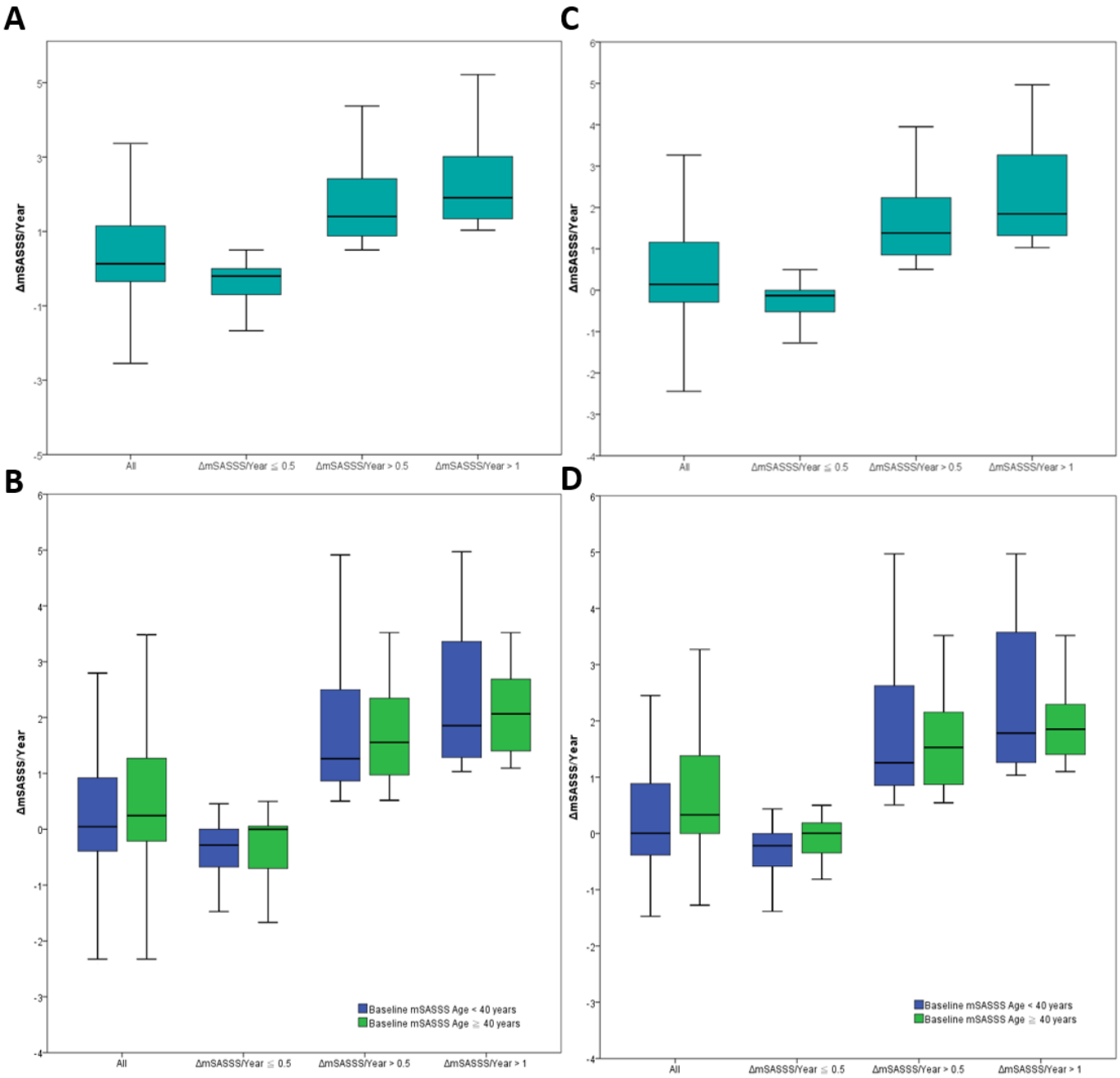

Figure 1. Annual mSASSS progression rates (ΔmSASSS/year) among 379 observational intervals and 242 study patients. (A) Box plots for annual mSASSS progression rates among 379 intervals, (B) stratified by age at baseline mSASSS. (C) Box plots for annual mSASSS progression rates among 242 patients, (D) stratified by age at baseline mSASSS.

Table 1. Time-dependent generalized estimating equation analysis for associated and protective factors for rapid spinal radiographic progression.

	Univariable		Multivariable 1		Multivariable 2	
	OR (95% C.I.)	***p*-value**	**aOR (95% C.I.)**	***p*-value**	**aOR (95% C.I.)**	***p*-value**
Age at baseline mSASSS	1.02 (1.001–1.03)	**0.039**	1.03 (1.003–1.06)	**0.031**	1.03 (1.01–1.05)	**0.013**
Age at baseline mSASSS ≥40	1.33 (0.90–1.98)	0.153				
Male gender	1.84 (1.06–3.19)	**0.031**	1.88 (0.67–5.24)	0.229	1.82 (0.66–5.01)	0.243
HLA-B27 positivity	0.86 (0.53–1.39)	0.534				
Ever smoker	1.36 (0.91–2.02)	0.130	0.75 (0.39–1.47)	0.407	0.74 (0.38–1.45)	0.379
Baseline mSASSS	1.01 (1.000–1.01)	**0.045**	1.00 (0.99–1.01)	0.911		
Baseline mSASSS >5	1.54 (1.01–2.34)	**0.045**			1.18 (0.65–2.15)	0.583
ASDAS-CRP (during the intervals)	1.24 (0.93–1.66)	0.148	1.22 (0.83–1.78)	0.308	1.20 (0.83–1.73)	0.333
Comorbidities (≥1 inpatient visit or ≥1 ambulatory visit within one year before index date)						
Hypertension	1.44 (0.76–2.72)	0.259				
Diabetes mellitus	0.91 (0.28–2.89)	0.867				
Uveitis	1.31 (0.69–2.47)	0.404				
Cumulative DDD of medications (during the intervals)						
Corticosteroids, mg/day	1.04 (1.02–1.05)	**<.0001**	1.02 (0.95–1.10)	0.524	1.02 (0.95–1.10)	0.519
NSAIDs, cDDD/100	0.63 (0.42–0.93)	**0.020**	0.38 (0.19–0.75)	**0.005**	0.38 (0.19–0.75)	**0.005**
Methotrexate, cDDD/100	0.85 (0.71–1.02)	0.086	0.96 (0.71–1.30)	0.807	0.97 (0.72–1.29)	0.817
Sulfasalazine, cDDD/100	0.64 (0.32–1.28)	0.207				
TNF-α inhibitors, cDDD/100	0.80 (0.49–1.32)	0.383	0.55 (0.24–1.30)	0.174	0.52 (0.22–1.24)	0.141
Secukinumab, cDDD/100	1.00 (0.97–1.03)	0.934	1.01 (0.98–1.04)	0.569	1.01 (0.98–1.04)	0.594
Logarithm of mean laboratory recordings (within one year before index date)						
Serum creatinine, mg/dL	1.63 (0.58–4.57)	0.356				
GPT, U/L	1.22 (0.90–1.65)	0.196	0.84 (0.50–1.39)	0.493	0.84 (0.51–1.39)	0.500
White blood cell count, /μL	2.54 (1.22–5.27)	**0.013**	2.99 (0.87–10.32)	0.083	2.81 (0.84–9.46)	0.095
Hemoglobin, g/dL	5.31 (0.91–31.08)	0.064	0.27 (0.01–7.69)	0.445	0.27 (0.01–7.33)	0.435
Platelet count, $x10^3$/μL	1.44 (0.62–3.32)	0.396				
RDW, %	1.23 (0.22–6.73)	0.812				

A *p*-value < 0.05 is considered statistically significant. Baseline mSASSS is the first recorded mSASSS for each observational interval and each study patient. Index date indicates the date of baseline mSASSS.

aOR, adjusted odds ratio. ASDAS, Ankylosing Spondylitis Disease Activity Score. cDDD, cumulative defined daily dose. C.I., confidence interval. GPT, glutamate-pyruvate transaminase. HLA-B27, human leukocyte antigen B27. CRP, C-reactive protein. mSASSS, Modified Stoke Ankylosing Spondylitis Spine Score. NSAIDs, non-steroidal anti-inflammatory drugs. RDW, red blood cell volume distribution width. TNF-α, Tumor necrosis factor-α.