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**THU0710 VALIDATION OF NEW WEIGHTED SCORING SYSTEM TO PREDICT MODIFIED HEALTH ASSESSMENT QUESTIONNAIRE SCORES IN PATIENTS WITH RHEUMATOID ARTHRITIS USING NATIONAL DATABASE OF RHEUMATIC DISEASES IN JAPAN DURING 2009 AND 2014**

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**Background:** We reported the impact of joint diseases on modified health assessment questionnaire (MHAQ) scores determined using 2011 data from NinJa (National Database of Rheumatic Diseases by iR-net in Japan). The MHAQ score was significantly associated with disease in almost all joints and physical ability tended to become aggravated. We also developed a joint-weighted scoring system from odds ratios. Respective integer scores assigned to disease in bilateral and unilateral joints comprised shoulder, 4 and 2; elbow, 3 and 2; wrist, 2 and 2; hip, 0 and 3; knee, 3 and 2; ankle, 2 and 2; finger, 1 and 1. Statistical analyses indicated a cut-off at 3 points using this system (Ono K, et al., *Modern Rheumatology*, 2016).

**Objectives:** To validate the weighted scoring system using NinJa data from 2009 and 2014.

**Methods:** We analyzed data from 7,189 and 13,459 patients listed in the NinJa database during 2009 and 2014. The presence or absence of disease in each joint (swelling and/or tenderness were considered to indicate active disease) and whether the disease was bilateral or unilateral were investigated. We calculated joint scores for each patient using a weighted scoring system and then created ROC curves for each patient based on total scores.

**Results:** Patients in the 2009 and 2014 groups were aged 62.4±12.6 and 64.1±12.8 years, median DAS28 CRP values were 2.9 and 2.4, and total joint scores were 3.4 and 2.4 with a significant difference ( $p < 0.05$ ; Wilcoxon signed-rank test) between the two groups. Analyses of ROC curves generated from scores derived using the new system and MHAQ revealed a cut-off of 3 points (same as 2011); AUC, 0.72, 0.68 (Table 1).

Variable	2009 (n=7,189)	2014 (n=13,459)	P value
Age (mean ± SE, years)	62.4±12.6	64.1±12.8	<0.05
Duration of disease (mean ± SE, years)	12.7±10.7	13.0±12.9	0.68
MHAQ score (median)	0.25	0.13	<0.05
DAS28 CRP (median)	2.9	2.4	<0.05
DAS28 ESR (median)	3.6	3.0	<0.05
Total joint score (median)	3.4	2.4	<0.05
Joint score: ROC analysis' cut-off value	3.0	3.0	
AUC	0.72	0.68	

**Conclusions:** Disease activity changed from moderate to low in the NinJa cohorts and the scoring system was validated for the years 2009 and 2014. The weighted scoring system appears useful to predict functional disability in a simpler way by examining each joint rather than changes in disease activity among patients with RA.

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**THU0711 IMPACT OF SPORTS PRACTICE IN PATIENTS WITH ANKYLOSING SPONDYLITIS: A SYSTEMATIC REVIEW OF RANDOMIZED CONTROLLED STUDIES**

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**Background:** The recent update of the ASAS-EULAR management recommendations for axial spondyloarthritis highlights effectiveness of home exercises and physical therapy. However, the adherence rates to these structured exercises are low, what could limit their long-term effectiveness. An option could be to replace or to complete the practice of specific exercises with the regular practice of a recreational sport activity. Data concerning the effectiveness and tolerance of sports in ankylosing spondylitis (AS) are scarce.

**Objectives:** To assess the tolerance and effectiveness of recreational sports practice on function, spinal mobility, disease activity, pain and quality of life in patients with AS.

**Methods:** A systematic review was performed according the PRISMA guidelines, using the following search engines: MEDLINE (Pubmed), COCHRANE Library, Google Scholar and Physiotherapy Evidence Database (PEDro), completed by a manual research. We included randomized controlled trials (RCTs) from 1984 to September 2016, with participants with AS fulfilling the New York modified criteria, and interventions involving sports practice. We defined "sports" according to the MeSH definition as "Activities or games, usually involving physical effort or skill [with purpose of] pleasure, competition, and/or financial reward." Exercise therapy and physiotherapy were not included in the research. The outcomes measured were the followings: stiffness/spinal mobility, function, disease activity, quality of life, pain, side effects. Methodological quality was assessed using the PEDro scale.

**Results:** From the 40 studies identified after screening, only 5 articles were selected for eligibility. One study was excluded (poor quality). The 4 RCTs concerned a total of 187 AS patients. Interventions were Pilates, Tai Chi, swimming, walking, and exergames. Control groups received either no specific intervention or standard exercise therapy. The studies were too heterogeneous to be pooled but the comparisons inter and intra-groups in each study tended to show significant effectiveness of sports practice on function, activity and spinal mobility. Data on tolerance were scarce, but no significant side effect was reported.

**Conclusions:** Recreational sports practice may improve function, activity and spinal mobility in patients with AS. However, there are very few studies available, and evidence-level is low. More controlled randomized clinical trials should be conducted in the future to confirm the effectiveness and safety of sports in AS.

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**THU0712 DUTCH NORM SCORES FOR FOUR DUTCH-FLEMISH PROMIS ITEM BANKS IMPORTANT FOR PATIENTS WITH RHEUMATOID ARTHRITIS**

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**Background:** In the assessment of patients with rheumatoid arthritis (RA) it is important to measure physical function, fatigue, pain behavior and pain interference. The Patient-Reported Outcomes Measurement Information System (PROMIS) initiative developed item banks for measuring these concepts. These item banks were translated into Dutch-Flemish language.

**Objectives:** To facilitate interpretation and implementation of PROMIS in the Netherlands, we aimed to calibrate and validate the Dutch-Flemish PROMIS Physical Function (DF-PROMIS-PF), Fatigue (DF-PROMIS-FA), Pain Behavior (DF-PROMIS-PB) and Pain Interference (DF-PROMIS-PI) Item Banks in the general Dutch population, to obtain Dutch norm scores for these item banks.

**Methods:** 3365 persons of the general Dutch population completed a web-based survey, of which 1309 persons completed the full DF-PROMIS-PF (121 items), 1007 persons completed the full DF-PROMIS-FA (95 items), and 1049 persons completed the full DF-PROMIS-PB (39 items) and the full DF-PROMIS-PI (40 items). The sample was stratified for gender, age, education, and ethnicity according to the distribution of the 2015 census of the general Dutch population. A one-factor confirmatory factor analysis (CFA) was performed per item bank to assess unidimensionality. A graded item response model (GRM) was fitted per item bank to evaluate the item characteristics of the item banks and to facilitate future development of computer adaptive tests (CATs). Ordinal regression models were used to evaluate Differential Item Functioning (DIF) for language (Dutch vs. English) as a measure of cross-cultural validity.

**Results:** All four item banks showed good fit to the GRM: they showed good fit indices for CFA and high percentages of explained variance by first factor. The item banks showed only little local dependency and the scalability coefficients suggested strong scalability for all four item banks. The item characteristics

showed good coverage across the range of the four concepts. DIF analyses are in progress.

**Conclusions:** The item banks exhibited good psychometric properties in the general Dutch population. The four Dutch-Flemish PROMIS item banks can be used to develop CATs for measuring physical function, fatigue, pain behavior and pain interference in the Netherlands. Dutch norm scores are presented.

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#### THU0713 HOW THE VARIATION IN THE LUMBOPELVIC PATTERNS OF MOVEMENT AFFECTS THE NEUROMOTOR CONTROL OF THE BICEPS FEMORIS DURING TRUNK FORWARD BENDING

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**Background:** Trunk forward bending is one of the most common activities in daily living; it is a two-part movement involving the lumbar spine flexion and pelvis rotation at hip joint. The pattern of movement during forward bending was defined as the relative contribution of the lumbar spine to pelvis motion, and was expressed as the ratio between the ranges of lumbar spine motion to pelvis motion (L/P), which, calculated at certain degrees of trunk flexion during the entire movement, provides the lumbo-pelvic rhythm. This is associated with a specific pattern of activation for back and hip extensor muscles which was coined as flexion relaxation phenomenon, observed either in the erector spinae and biceps femoris (BF). It has been shown that in healthy people lumbopelvic pattern of movement for entire flexion varies, showing both lumbar spine dominant and pelvis dominant-patterns of movement.

**Objectives:** To find out whether the variation in the lumbopelvic pattern of movement (lumbar spine or pelvis dominant) affects the appearance of the relaxation of the BF during trunk forward bending.

**Methods:** Surface electrodes were applied to the skin on right BF, midway between ischial tuberosity and head of fibula to record EMG during a trunk flexion movement from the upright position. The EMG signal was full-wave rectified and averaged (40ms) to produce a linear envelope. An electrogoniometer measured the differential lumbar spine - pelvis sagittal angular displacement during trunk flexion in asymptomatic subjects. Both signals (EMG and degrees) were synchronously and continuously captured during the movement. Ranges of flexion (ROF) for the lumbar spine, pelvis and trunk motion were calculated for the entire movement. The subjects (both sexes) were assigned to group-L (n=11) and group-P (n=15) according to exhibiting lumbar spine and pelvis dominant patterns of movement (average age, 24.5±3.3years). The myoelectric relaxation (MR) appearance was defined in terms of degrees of flexion where the electrical activity of the BF was less than that in upright posture (EMG basal), at this point the degrees of flexion for the pelvis and spine were determined; and their respective "range of motion" (ROM) was calculated and normalized to range of trunk flexion. One-way MANOVA was used to determine differences in range of flexion at the appearance of the myoelectric relaxation between groups.

**Results:** ROF for MR of the BF was significantly greater in group-P (77,3%±3,4%) (p<0.01) than in group-L (47,8%±2,4%) for the pelvis, whereas ROF for the lumbar spine was significantly greater in group-L 95%±1,2% (p<0.01) than in group-P 40,41%±1,7%.

**Conclusions:** In healthy subjects, differences in lumbopelvic patterns of movement during trunk flexion vary the appearance of the relaxation of the biceps femoris in the range of flexion. Present results show that the variance of the lumbar spine and pelvis Kinematics is associated with the neuromotor control of the biceps femoris.

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#### THU0714 INVESTIGATING THE EFFECTS OF HYPERMOBILITY ON BALANCE VARIABLES

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**Background:** Hypermobility syndrome (HMS) is a clinical syndrome in which the range of motion of the joint is observed above normal ranges without being associated with a rheumatic disease. Excessive joint motion in HMS reduces joint stability and joint position sense and also can cause pain. Decreased muscle tone and tensile forces of the tendons cause decreased locomotor system stiffness and impairment of proprioception mechanisms. These problems in proprioceptive mechanisms can lead to balance-related disorders in individuals with hypermobility syndrome

**Objectives:** The aim of this study was to investigate the possible effects of hypermobility on balance variables.

**Methods:** 50 hypermobile (5 males and 45 females) volunteers diagnosed with Brighton Scale and 50 healthy (21 males and 29 females) volunteers were included in this cross sectional study. Participants with a score of 4 or over according to the Beighton scale were referred to a rheumatologist and were administered Brighton scale. Participants who were diagnosed by the physician were included in the hypermobile group. The objective balance evaluation was conducted using a balance platform. Evaluation variables were; static balance on single foot, static balance on both feet, limits of stability test and tandem walking. analysis was performed using independent samples t-test.

**Results:** The mean age was found 21,69±2,13 years old for the control group and 20,09±2,65 years old for the HMS group. Body Mass Index was found 22,13±3,54 kg/m<sup>2</sup> in the control group and 21,54±3,50 kg/m<sup>2</sup> in the HMS group. HMS group showed significant wider step width in tandem walking (p=0,001), significantly longer reaction time (p=0,23, p=0,030), significantly higher end-point excursion (p=0,003, p=0,026, p=0,049), significant higher mean maximum excursions (p=0,018) (Table 1).

Table 1. Comparison of Groups About Balance Variables

	HMS Group (Mean ± SD)	Control Group (Mean ± SD)	p
Tandem Walking			
Step-Width (cm)	6,52±0,89	7,20±1,10	0.001*
Limits Of Stability			
Reaction Time 2 (sec)	0,91±0,44	0,72±0,37	0.023*
Reaction Time 6 (sec)	0,78±0,36	0,64±0,25	0.030*
End-Point Excursion 1 (%sec)	86,69±17,73	73,19±26,17	0.003*
End-Point Excursion 4 (%sec)	76,56±17,36	83,92±14,91	0.026*
Maximum Excursion 5 (%sec)	76,54±18,31	82,69±11,50	0.049*
Mean Maximum Excursion (%sec)	94,56±6,51	97,25±4,29	0.018*

\*p<0.05.

**Conclusions:** In this study it was found that hypermobility has significant effects on the stability limits test and tandem walking. In previous studies it was found that hypermobility affects the static balance assessment variables (1, 2), but in this study dynamic balance assessment variables were affected.

**References:**

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#### THU0715 ESTIMATION OF THE EFFECT OF FOOT ORTHOTICS ON HIP JOINT LOADING FOR RHEUMATOID ARTHRITIS PATIENTS USING MRI-BASED MUSCULOSKELETAL MODELS: A PILOT STUDY

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**Background:** Over 85% of rheumatoid arthritis (RA) patients experience feet and ankle problems during the course of the disease. Persistent foot and ankle problems still occur even after clinical remission is reached [1]. In RA, synovitis, effusion, and eventually erosive arthritis are thought to cause clinically recognizable planovalgus or valgus heel [1]. With the intention to stabilize and align the foot, patient-specific foot orthotics (FO) are commonly prescribed to this patient group. A limitation of the previous literature on FO to treat RA and related diseases is that it has focused exclusively on clinical outcomes of FO such as pain and physical function, while overlooking the biomechanical principles on which the rationales for FO is based [2].

**Objectives:** The aim of this study was to investigate the effect of patient-specific FO on hip loading during gait. This was accomplished by developing patient-specific (PS) musculoskeletal models (MS) capable of estimating joint mechanics with and without the FO.

**Methods:** Four early stage RA patients were recruited for this study. A pair of FO was developed for each patient using a weight bearing casting technique. PS bone geometry was obtained from magnetic resonance imaging (MRI) images and segmented in an image analysis package (Mimics 19, Materialise, Belgium). Motion capture was performed with an eight-camera setup (Qualysis, Sweden) with reflective markers together with three force plates (AMTI, USA) sampling at 100 and 1000 Hz, respectively. The gait trials consisted of two conditions: one with the PS FO and one with a control insole (C). PS MS models of each patient were developed using the AnyBody Modeling System (AnyBody Technology, Denmark), Figure 1A. Muscle attachments were made PS based on the Twente Lower Extremity Model version 2.0 dataset using advanced morphing to customize a generic cadaver-based model with respect to PS morphology