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### Physical Activity Monitoring using Wrist-Worn Accelerometer in the Assessment of Patients with Myositis.

**Objectives:** Wrist-worn accelerometers allow for the objective estimation of physical activity (PA) in daily life. Recently, the ENMC workshop on outcome measures in myositis suggested to implement PA monitoring for improving patient follow-up. This study aimed to evaluate PA monitoring in the assessment of myositis patients in daily clinical practice.

**Methods:** Included patients had a diagnosis of dermatomyositis (DM), immune-mediated necrotizing myopathy (IMNM) or overlap myositis (OM). They either had a new-onset or relapsing myositis, a stable disease on maintenance therapy or were undergoing immunosuppressant tapering. Patients were evaluated at baseline (M0) and 6 months (M6). IMACS core-set measures, ACR/EULAR improvement score, muscle endurance testing, deltoid and psoas strength using hand-held dynamometry, 14-days raw acceleration data (expressed both as mean daily Euclidean norm minus 1 g (ENMO) and as standard deviations from healthy control Z-score), and quality of life questionnaires were recorded. Relationships between variables were investigated using Spearman correlation coefficient ( $\rho$ ) and random forest (RF) regressions.

**Results:** Fifty-five patients (16 OM, 27 IMNM and 12 DM) were included. At baseline, 67% had ENMO Z-score lower than 1 (mean Z-scores  $-1.09 \pm 0.94$ ) and least significant change in ENMO was 4.10 mg/day.

At M0, ENMO mainly correlated with manual muscle testing 8 (MMT8,  $\rho=0.44$ ,  $p=0.001$ ), creatinine level ( $\rho=0.43$ ,  $p=0.001$ ), HAQ ( $\rho=-0.53$ ,  $p<0.001$ ), and SF-36-physical functioning ( $\rho=0.40$ ,  $p=0.002$ ). According to RF regressions, most important features associated with ENMO Z-scores were HAQ, SF-36-physical functioning/energy/pain and disease duration.

At M6, absolute ENMO changes mainly correlated with changes in depression score ( $\rho=-0.57$ ,  $p=0.001$ ), HAQ ( $\rho=-0.51$ ,  $p<0.001$ ), and SF-36-energy/fatigue ( $\rho=0.51$ ,  $p<0.001$ ). According to the RF regression, most important features associated with ENMO changes were absolute change in MMT8, HAQ, SF-36-physical functioning, physician global assessment, and depression score.

Changes in ENMO were correlated with ACR/EULAR improvement score ( $\rho=0.57$ ,  $p<0.01$ ) and all patients, except one, achieving a major improvement at M6 had an absolute change in ENMO  $> 4.1$  mg/day. Yet, only 50% with moderate improvement (ACR/EULAR) at M6 had an improvement in ENMO and variable changes in ENMO were observed in patients with unchanged and minimally improved status.

**Conclusions:** PA levels were lower in myositis patients at baseline compared to healthy controls and were correlated with muscle strength and function, while PA change was also associated with emotional change. Patients with major ACR/EULAR improvements at follow-up were associated with consistent changes in PA, while others displayed heterogeneous changes.