

SESSION 7 Teamwork makes the dream work session

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A COMPOSITE FITNESS PROFILE IN JUVENILE IDIOPATHIC ARTHRITIS AND FAMILIAL MEDITERRANEAN FEVER COMPARED TO HEALTHY PEERS: FAST AND FIT

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Introduction: Physical fitness (PF) is a key determinant of health outcomes, and its assessment in children and adolescents provides an effective means of estimating overall health status and functional ability (1).

Objectives: The aim of this study was to evaluate the PF profile of patients diagnosed with Juvenile Idiopathic Arthritis (JIA) and Familial Mediterranean Fever (FMF) and to compare the results with healthy peers.

Methods: A total of 343 children and adolescents aged 8–18 years participated in the study (JIA: 117, FMF: 61, Healthy: 166). PF was assessed using FitnessGram tests: Curl-Up Test (CT), Push-Up Test (PT), Trunk Lift Test (TLT), Back-Saver Sit and Reach Test (BSSRT), and the Progressive Aerobic Cardiovascular Endurance Run (PACER), along with estimated VO_2 max. Functional capacity was evaluated using the 6-Minute Walk Test (6MWT), 30-Second Sit-to-Stand Test (30SST), and 10-Stair Climb Test (10SCT). Group comparisons were performed using ANOVA, post-hoc Tukey, and ROC analysis. A Composite Fitness Score (CFS) was calculated by averaging the z-scores of ten fitness and functional capacity tests. Each raw score was standardized and averaged to generate a single composite indicator of physical fitness.

Results: The mean ages of participants with JIA, FMF, and healthy controls were 13.19 ± 1.34 , 13.52 ± 1.45 , and 13.32 ± 1.34 years, respectively. Patients with JIA and FMF had significantly lower PF and functional capacity compared to their healthy peers ($p < 0.05$). The 30SST demonstrated the highest discriminative accuracy (AUC = 0.85), PT (AUC = 0.75) and CT (AUC = 0.72) also showed good discriminative value, whereas the 6MWT and BSSRT were less predictive (AUC = 0.67 each). The healthy group had a significantly higher CFS (+0.22) compared to JIA (-0.20) and FMF (-0.23) ($p < 0.001$) however, no significant difference was observed between the JIA and FMF ($p > 0.05$). According to the Random Forest regression analysis based on participants' CFS scores, PT, BSSRT, and PACER were identified as the most important predictors of PF.

Conclusion: The findings of this study demonstrate that PF and functional capacity outcomes are significantly lower in patients with JIA and FMF, particularly among those with JIA. The primary determinants of PF were identified as upper extremity muscular endurance and strength, flexibility, and aerobic performance. One of the key outcomes of the study is the identification of the 30SST as an excellent potential for rapid fitness screening in adolescents. Furthermore, the incorporation of the PT, BSSRT and PACER into the evaluation process has been shown to be valuable in identifying risk factors and planning of targeted exercise interventions.

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References: Day et al. 2023. NYC FITNESSGRAM: population-level physical fitness surveillance for New York City youth. American Journal of Epidemiology