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#53 Michel Audiffren: Effects of technology-assisted physical activity interventions on circulating biomarkers for neuromuscular function in community-dwelling older adults aged 60 years old and above: A systematic review and meta-analysis

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Background: Neuromuscular function is essential for maintaining mobility and independence in aging populations. Technology-assisted physical activity interventions (e.g., exergaming, virtual reality, and wearables) offer promising alternatives for improving neuromuscular health. However, little is known about their impact on circulating biomarkers, particularly exerkines—molecules released in response to exercise that mediate neuroplasticity, inflammation, and metabolism.

Objective: This systematic review and meta-analysis examine the effects of technology-assisted physical activity interventions on circulating biomarkers of neuromuscular function in community-dwelling older adults (≥60 years).

Methods: Following PRISMA guidelines, a comprehensive search of PubMed, Web of Science, and Scopus was conducted. Eligible studies included randomized controlled trials (RCTs) assessing changes in circulating biomarkers following technology-assisted physical activity interventions. Primary outcomes included neuroplasticity markers (e.g., BDNF, NGF), inflammatory markers (e.g., IL-6, TNF-α), and adipocytokines (e.g., leptin, adiponectin). A meta-analysis was performed using standardized mean differences (SMD) to evaluate intervention effects.

Results: Meta-analysis revealed significant increases in neuroplasticity markers (BDNF, NGF, NT3), suggesting enhanced synaptic plasticity and cognitive function. Inflammatory markers (IL-6, TNF-α) showed a reduction, indicating potential anti-inflammatory benefits of technology-assisted interventions. However, heterogeneity across studies highlighted the need for standardized protocols in biomarker assessment.

Conclusion: Technology-assisted physical activity interventions appear to positively influence biomarkers of neuromuscular health in older adults, bridging the gap between traditional mechanical assessments and biochemical measures. Future research should establish standardized protocols and explore long-term effects to optimize intervention strategies for healthy aging.