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Electromyography and ultrasound scan analysis of muscle activity during virtual reality dynamic plank exercise on ICAROS Pro machine.

This study evaluates neuromuscular activation and musculoskeletal safety during virtual reality dynamic plank exercise on the ICAROS Pro machine, with a focus on both electromyography (EMG) and ultrasound scan outcomes. Sixteen healthy adults aged 21–55 first underwent ultrasound scans, which confirmed intact rotator cuffs and normal biphasic arterial blood flow, ruling out any musculoskeletal or vascular pathology prior to exercise. EMG sensors were then applied to the trapezius and erector spinae muscles during simulated “Eden track” VR flights. Major torque events—one left concave, one right concave—led to significantly increased EMG activity, particularly in the upper trunk muscles. Sensor data reflected dynamic, direction-specific neuromuscular responses. Post-exercise ultrasound scans confirmed continued musculoskeletal and vascular health across all subjects. These findings highlight that virtual reality flight simulation on the ICAROS Pro efficiently stimulates key muscle groups while maintaining musculoskeletal integrity, supporting its potential in sports training, rehabilitation, and injury prevention.

Keywords
Electromyography, ICAROS Pro, Virtual reality exercise, Muscle activation, Spinal protection, Rehabilitation.

Biography
Dr. Khaled Salih is a dedicated medical professional who graduated from the University of Khartoum, Faculty of Medicine, in 2020. He holds a master’s degree in Human Applied Clinical Anatomy from National University. Dr. Salih is currently working in the Trauma and Orthopaedic Surgery Department at United Lincolnshire Hospitals Trust, where he actively participates in research and quality improvement projects. He is also a full member of the Royal College of Surgeons of Edinburgh.

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