

AI-Driven Diagnostics and Gait Analysis in Multiple Myeloma: A Clinical Image Report

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CLINICAL IMAGE

A 60-year-old female diagnosed with multiple myeloma presented with progressive gait instability, lower limb weakness, and thoracolumbar pain. Clinical images include radiographs and MRI scans demonstrating multiple osteolytic lesions involving the thoracic and lumbar vertebrae with early vertebral collapse. In addition, AI-driven gait analysis using wearable sensors and video-based motion capture revealed reduced stride length, asymmetrical step time, decreased walking velocity, and increased double-support phase, indicating compromised postural stability and musculoskeletal load adaptation. Heat-map diagrams generated by the AI platform highlighted abnormal joint loading patterns at the hip and knee, correlating with skeletal involvement and pain-avoidance strategies. These integrated clinical images illustrate the complementary role of advanced imaging and artificial intelligence-based functional assessment in multiple myeloma. Early identification of structural pathology combined with objective gait deviations supports timely clinical decision-making, personalized rehabilitation planning, fall-risk reduction, and monitoring of disease-related functional impairment, thereby enhancing overall patient care and quality of life.

Keywords Multiple myeloma; Artificial intelligence; Clinical images; Gait analysis; Osteolytic lesions; Magnetic resonance imaging; Wearable sensors; Functional assessment; Rehabilitation planning; Fall risk assessment

