The Future is Mobile: Validating Apple Health as Novel Orthopaedic Trauma Outcome Metric

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Purpose: Surgeons often lack objective data on patient functional outcomes, particularly in comparison to the patient's baseline. This study aimed to determine whether gait parameters recorded on Apple devices are sensitive to the mobility changes of injury and recovery and correlate with patient-reported outcome measures.

Methods: A cross-sectional study included adult patients with lower extremity fractures who owned iPhones and had at least 6 months of follow-up. Participants shared Apple Health data after informed consent. Five gait parameters were analyzed: step count, walking asymmetry, double support, walking speed, and step length. Fixed effects regression tested changes from pre- to post-injury and from post-injury month 1 to month 6. Pearson's correlation assessed the relationship between gait parameters and Patient Reported Outcomes Measurement Information System (PROMIS) scores for physical function and pain.

Results: 42 patients participated. Step count declined 91% from pre- to post-injury (P<0.001) and increased 5-fold from month 1 post-injury to month 6 (P<0.001), while still remaining 60% below baseline in month 6. Other gait parameters showed significant changes with injury but not recovery. Step count positively correlated with PROMIS physical function scores (P<0.001). Other correlations were not significant.

Conclusion: Smartphone-derived mobility parameters, especially step count, track mobility changes due to lower extremity fractures. These parameters have potential as objective longitudinal outcome metrics in orthopaedic trauma.