Conceptual Development of a Wearable Patch for Continuous Osteoporosis Monitoring

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Abstract:

Osteoporosis is a progressive condition that weakens bones and increases fracture risk. Current clinical monitoring depends on infrequent bone density scans and biomarker tests, which can be inconvenient and fail to capture early or real-time changes. This conceptual study explores the idea of a wearable patch designed to monitor bone health continuously outside the clinic. At the stage, the concept is entirely exploratory, with no existing prototype or developed technology. The goal is to gather ideas, information, and feedback that could shape future designs. Key considerations include identifying relevant biomarkers of bone remodeling, evaluating non-invasive detection methods such as ultrasonic or biochemical sensing, and ensuring signal accuracy. Additional factors include biocompatible materials for comfort, smartphone data integration, and patient usability. By combining diagnostic methods with future wearable technologies to support real-time, patient-centered osteoporosis monitoring.